GRAY'S . .

PHARMACEUTICAL

QUIZ COMPEND

3 1761 05478795 7

A CONDENSED COMPENDIUM

OF

PHARMACEUTICAL KNOWLEDGE ;

A QUIZ BOOK)

BY

H. C. GRAY, PH. G., AND C. H. BRYAN, M. D.

0

EDIT. **NINTH EDITION.**

DESIGNED FOR THE USE OF PHARMACEUTICAL STUDENTS PREPARING THEMSELVES FOR EXAMINATION IN COLLEGES OF PHARMACY, AND BEFORE THE PHARMACEUTICAL EXAMINING BOARDS OF THE VARIOUS STATES.

PRICE BY MAIL, POSTAGE PREPAID, $1.50

1) #
CHICAGO, ILLINOIS:
2) GRAY & BRYAN, # PUBLISHERS, Box 593.
3) 1892.

Copyrighted by H. C. Gray, 1892.

LIBRARY
SEP 13 1967
UNIVERSITY OF TORONTO

PREFACE.

HAVING exhausted eight editions of the Quiz Compend, we take pleasure in presenting this, the ninth edition, to our patrons, trusting it may meet the same generous approval as the former ones. The book has been thoroughly revised, and such additions made as seemed necessary to meet the growing demand for a condensed, practical work of this kind.

It has been our constant study to bring points and technicalities of the drug business to the mind in a condensed form. It is not intended to make pharmacists out of men wholly unacquainted with the business. But if the questions and answers, as laid down in this work, be carfully studied, taken together with the experience which one should have, you will surely succeed in passing any examination on practical or technical pharmacy. This work is intended to prepare one for either the assistant's or pharmacist's examination.

THE AUTHORS.

Digitized by the Internet Archive
in 2007 with funding from
Microsoft Corporation

http://www.archive.org/details/condensedcompend00grayuoft

GRAY'S PHARMACEUTICAL
QUIZ COMPEND.

NINTH EDITION.

ABREVIATIONS.

Add	Addantur	Add
Admov	Admoviatur	Apply
Adst. febr	Adstante febre	When fever is on
Altern. hor	Alternis horis	Every other hour
Alt. noct	Alternis noctibus	Every other night
Aq. Bull	Aqua Bulliens	Boiling water
Aq. dest	Aqua destillata	Distilled water
Aq. com	Aqua communis	Common water
Aq. fluv	Aqua fluviatilis	River water
Aq. Pluv	Aqua pluvialis	Rain water
Bis. in d	Bis in die	Twice a day
Chart	Chartula	A powder
Coch. mag	Cochleare magnum	A tablespoon'l
Coch. med	Cochleare mediocre	A dessert spoonful
Coch. parv	Cochleare parvum	A teaspoonful
Colet	Coletur	It should be strained
Collyr	Collyrium	Eye water
Comp	Compositus	Compound
Cort	Cortex	A bark
Cong	Congius velCongii	A gallon or gal's
Decoct	Decoctum	A decoction
Dim	Dimidius	One-half
Emp	Emplastrum	A plaster
Enem	Enema	A clyster
Ft. pil	Fiat Pilulæ	Make pills
Ft. haust	Fiat haustus	Make a draught
Ft. Mass	Fiat massa	Make a mass

F. S. A	Fiat secundum artem	Make according to art
Fl	Fluidus	Liquid
Fol	Folia	Leaves
Garg	Gargarisma	A gargle
Gr	Granum	A grain
Gtt	Gutta	A drop
Hor. decub	Hora decubitus	At bed time
In. d	In die	Daily
Inf	Infusum	An infusion
Lb. lb	Libra	A pound
M	Misce	Mix
Mass	Massa	A mass
Min	Minimum	The 60th of a drachm
Mist	Mistura	A mixture
No	Numero	In number
O	Octarius	A pint
Om. hor	Omni hora	Every hour
Opt	Optimus	The best
Pil	Pilula vel pilulæ	A pill or pills
Ppt	Præparata	Prepared
Pulv	Pulvis	A powder
Q. S	Quantum sufficit	A sufficient quantity
℞	Recipe	Take
Rad	Radix	A root
Sem	Semen	A seed
S. or sig	Signa	Write
S. A	Secundum artem	According to art
Ss	Semisse	A half
Trit	Triturate	Rub to a powder
Tinct	Tinctura	A tincture
Ves	Vesicatorium applicetur	Apply a blister

Weight Measure and Specific Gravity.

What is weight? Weight is the difference between the attraction of the earth and that of surrounding bodies for bodies n the surface of the earth.

What is meant by Volume? Volume is the space occupied by a certain amount of matter.

What systems of Measures are used in Pharmacy? Apothecaries' or Wine Measure, Imperial or British, and the Metric system.

What standards are used upon which to base the system of Weights? The Grain and the Metre.

What system of weights used in Pharmacy are based on the Grain? The Troy or Apothecaries' system and the Avoirdupois system.

State the number of grains in an ounce, Avoirdupois and Apothecaries'.

437.5 Avoirdupois. 480 Apothecaries.'

Are the grains of each the same? Yes.

State the denominations of Troy or Apothecaries and Avoirdupois Weights.

Troy or Apothecaries' Weight:—20 grains, 1 scruple; 3 scruples, 1 drachm; 8 drachms, 1 ounce; 12 ounces, 1 pound.

Avoirdupois Weight:—437½ grains, 1 ounce; 16 ounces, 1 pound.

What is the difference in grains between the Avoirdupois and Troy pound? Avoirdupois pound, 7,000 grains; Troy pound, 5.760. Avoirdupois pound, 1,240 grains heavier.

What is the difference in grains between the Troy and Avoirdupois ounce? Avoirdupois ounce, 437½ grains; Troy ounce, 480 grains, Troy ounce, 42½ grains heavier.

What is a Minim? The 60th part of a fluid drachm.

Give tables of Apothecaries' or Wine Measure.

60 minims	1 drachm.
8 drachms	1 ounce.
16 fluid ounces	1 pint.
8 pints	1 gallon.

How many ounces in one Imperial pint? Twenty.

What is the equivalent of a—

Teaspoonful?	One Drachm.
Dessertspoonful?	Two Drachms.
Tablespoonful?	Four Drachms.
Wineglassful?	Two Fluid Ounces.

What is Specific Gravity? The comparative weight of bodies of equal bulk, water at a given temperature being the unit for solids and liquids, air or hydrogen the unit for gases.

Give two methods of taking the specific gravity of liquids.

Hydrometer and Specific gravity bottle.

How is the specific gravity of a solid obtained?

First weigh in the air, and then in water. Divide the first weight by the difference between the two. The quotient will be the specific gravity.

METRIC SYSTEM.

What are the units of the Metric System? Metre Litre, Gramme.

What is a Metre? One 40-millionth of the circumference of the earth at its poles.

How many inches in a Metre? 39.37.

What is a Litre? The cube of a tenth part of a metre.

What is its equivalent in ounces? 33.8149.

What is a Stere? It is a cubic metre, and is used for measuring large bulks of dry substances.

How does the Litre compare with one Quart? It is 6 per cent. greater.

What is a Gramme? The weight of a cubic Centimetre of water at 4° Centigrade.

How many grains does one "gramme" weigh? 15.432 grains.

Give table of metric system of weights and equivalents in grains.

One Milligramme	.0154 grains
One Centigramme	.1543 grains
One Decigramme	1.5434 grains
One Gramme	15.432 grains
One Decagramme	154.3234 grains
One Hectogramme	1543.2348 grains
One Kilogramme	15432.3487 grains

Give table of Metrie System of Capacity and equivalents in Apothecaries' measure.

Kilo-litre	264.19 gallons
Hecto-litre	26.419 gallons
Deca-litre	2.6419 gallons
Litre	2.1135 pints
Deci-litre	3.3816 fluid ounces
Centi-litre	2.7053 fluid drachms
Milli-litre	16.2318 minims

To convert Cubic centimeters into minims, multiply by 16.

To convert Grammes into drachms, divide by 4.

To convert Cubic centimetres into ounces, divide by 32.

To convert minims into c.c. or grains into grams. divide by 16.

To convert fl. dr. into c.c. or drachms into grams multiply by 4.

TABLE OF EQUIVALENTS.

LIQUIDS.	APPROXIMATE EQUIVALENT.	EXACT EQUIVALENT.
1 minim	0.06 Cubic centimetre.	0.061 C. c.
1 fl. drachm	4 C. c.	3.696 C. c.
1 fl. oz	30 C. c.	29.574 C. c.
4 fl. ozs. or ¼ pint	118 C. c. (⅛ Litre).	118.295 C. c.
16 fl. ozs. or 1 pint	473 C. c. (½ Litre).	473.182 C. c.
2 pints	1 Litre (1000 C. c.)	.946 Litre.
1 gallon	4 Litres.	3.785 Litres.
1 Cubic centimeter	16 minims.	16.23 minims.
4 C. c	1 fluid drachm.	1.084 fl. drs.
15 C. c	½ fl. oz. (4 fl. drs.)	4.056 fl. drs.
30 C. c	1 fl. oz.	1.014 fl. ozs.
60 C. c	2 fl. ozs.	2.028 fl. ozs.
100 C. c	3⅓ fl. ozs.	3.381 fl. ozs.
120 C. c	4 fl. ozs. (¼ pint).	4.057 fl. ozs.
300 C. c	10 fl. ozs.	10.141 fl. ozs.
470 C. c	1 pint.	15.860 fl. ozs.
1000 C. c. (1 Litre)	2 1-10 pints.	2.113 pints
4 Litres	1 gallon.	1.056 gals.

SOLIDS.		
1-120 gr	0.00054 grm.	0.000539 grm.
1-100 gr	0.00065 grm.	0.000647 grm.
1-64 gr	0.001 grm.	0.001013 grm.
1-40 gr	0.0016 grm.	0.001620 grm.
1-32 gr	0.002 grm.	0.002025 grm.
1-10 gr	0.0065 grm.	0.006479 grm.
1-3 gr	0.021 grm.	0.021599 grm.
1 gr	0.065 grm.	0.064798 grm.

NEW REMEDIES.

The following brief notes may serve as a ready reference:

AMYLENE HYDRATE.—A clear, colorless liquid, insoluble in water, soluble in alcohol and ether. Its use is as a hypnotic, dose, one-half to one drachm in gelatine capsules.

AGARICINE.—An acid principle derived from white agaric, used with success for excessive perspiration in phthisis. It is a white amorphous, or white, silky, crystalline powder, little soluble in cold water; soluble in hot water to a turbid, strongly foaming liquid which reddens litmus. Soluble in 130 parts cold, and ten parts hot alcohol; easily in hot acetic acid and caustic alkalies. Best administered with Dover's powder, in powder, or pills. Dose, one-tenth to one-sixth grain.

ANTHRAROBINE.—A synthetical product used in place of chysarobine in treatment of psoriasis, herpes and other skin diseases. It is a pale yellowish powder soluble in ten parts hot glycerin, ten parts cold and five parts hot alcohol, insoluble in water.

ANTIFEBRINE, OR ACETANILIDE.—Colorless, crystals nearly insoluble in cold water, easily soluble in alcohol. Used as a febrifuge in doses of two to ten grains.

ACID, CAMPHONIC.—White needles of sour taste, odorless soluble in alcohol and ether. Antiseptic and astringent. Dose 2 grains.

ANTISEPSIN.—A white powder used as dusting powder or in ointments or lotion.

ANTIPYRINE.—Febrifuge, soporific, etc., readily soluble in water and alcohol. Dose, five to thirty grains in pills with tragacanth paste, or in solution. For hypodermic use, dissolve one drachm in two ounces of water by means of heat.

ASEPTOL (SOZOLIC ACID).—A thick fluid of a reddish color, soluble in water, alcohol and glycerin; used externally as an antiseptic. Usually dispensed in aqueous solution, one part to twenty or thirty of water.

ARISTOL.—A brownish-red odorless powder, slightly soluble in alcohol, soluble in chloroform and ether. Used in treatment of skin diseases.

BETOL.—Brilliant crystals, insoluble in water, soluble in alcohol and fixed oils. It is a remedy for rheumatism. Dose, fifteen to thirty grains in powder or pill. Also made into bougies with cacao butter (sixteen grains of the butter and four grains betol).

BISMUTH SUBIODIDE.—This salt occurs as a bright red powder of micro-crystalline structure, not soluble in any reagent without decomposition. It was recommended first by Lister, later by Reynold, for its antiseptic virtues as an application to indolent sores, purulent wounds, etc. Suspended in waters (1 per cent.) it forms a valuable injection for gonorrhœa; mixed with sugar and administered in doses of 3 to 5 grains, it has proven of incalculable benefit in typhoid fever and gastric ulcer

BROMETHYL (BROMIDE OF ETHYL.).—A colorless fluid, volatile, odor like chloroform. Should have a sp. gr. of 1.390 if pure. It is used as an anæsthetic like chloroform.

CAMPHOR DIBROMATED.—Properties same as those of camphor monobromated.

COCAINE.—Local anæsthetic. Dose one-tenth to one and two grains. Solutions best preserved with glycerin. Added with advantage to solutions of corrosive chloride for hypodermic use to deaden pain. The hydrochlorate and salicylate used in dressing wounds. Soluble in water, the four and ten per cent. solutions most frequently used. Amyl nitrate is an efficient antidote in poisoning by cocaine.

Chloralamide.—A new hypnotic, said to be more effectual and cheaper than sulphonal. Given in twenty to forty grain doses. It is best to dissolve it in a little brandy and add water according to liking. Its effect shown in from fifteen minutes to one hour, if given in solution. Given in solid form may not act for many hours.

Cistene.—A light amber colored liquid of an aromatic odor, and a pleasant pungent taste. Antiseptic, Prophylatic, used as an injection, gargle or lotion, and as a dressing for wounds, abscesses and ulcers. Internally to control fermentation and disinfect the stomach, dose one teaspoonful 3 or 4 times daily.

Colocynthine.—The glucoside of colocynth, soluble in water and alcohol. Dose, internally, one to five grains as a purgative, hypodermically, one-sixth to one-third grain dissolved in water.

Cotoine.—The solution in acetic ether used hypodermically for obstinate diarrhœa, intestinal ulceration, in chyrsosis and alcoholism. May be used in cholera, night sweats. The contents of a hypodermic syringe of a solution of one in four of acetic ether may be injected, and repeated in fifteen or twenty minutes, or every hour.

Diuretin.—A white crystalline powder, soluble in water, Diuretic. Dose 15 grains.

Eucalyptol.—A colorless, very mobile fluid, of an agreeable, peculiar aromatic and refreshing odor and pungent, spicy flavor. Very sparingly soluble in water. Easily soluble in alcohol. Valuable as an antiseptic, and said to be three times as powerful as carbolic acid in destroying bacteria. It is used like turpentine for inhalation, etc., and is much esteemed as an antipyretic in intermittent fever.

EXALGIN. — White odorless and tasteless cystals, soluble in water and alcohol. Dose 3 to 5 grains.

GUAIACOL.—The principal constituent of creosote, is a colorless liquid, soluble in ether, alcohol and fixed oils, only sparingly in water. Used as a remedy in phthisis in doses of one minim three times daily.

HYOSCINE.—The hydrochlorate, used internally in doses of 1-300 to 1-65 grain as a hypnotic for the insane. In smaller doses is a simple narcotic.

HYDROCHINON.—Is employed in medicine as an antipyretic. It is given in doses of fifteen grains, repeated every hour until the temperature is reduced to the desired point. Friends to its use state that it produces no disagreeable heart troubles.

HYPNONE (ACETO-PHENONE).—Colorless fluid sparingly soluble in water, more so in alcohol. Used as a hypnotic in doses of from three to eight mimins. Because of its somewhat caustic effect upon the mucous membrane, it is best dispensed in gelatine capsules, each containing one minim hypnone dissolved in nine of almond oil.

HYDROXYLAMINE HYDROCHLORATE.—This ammonia derivative occurs in colorless crystals of a saline taste, and is readily soluble in water, also in alcohol and glycerin. It is a very powerful reducing agent, and for this reason was utilized by chemists and photographers long before it was suggested for remedial purposes. It was recommended by Binz as a substitute for pyrogallic acid, chyrsarobin, chrysophanic acid and anthrarobin, over all of which it possesses the advantage of not soiling the patient's clothing. It has been used especially in the treatment of psoriasis. As it is very liable to be absorbed through the cutaneous structure and cause symptoms of toxicity, it is preferable not to apply the remedy to but limited spaces at a time.

Ichthyol.—Ammonium sulphichthyolate and sodium sulphichthyolate are both known, according to Dr. Unna, under the name ichthyol. Their action is precisely alike, the latter, owing to its density, being dispensed when pills are prescribed, the former in ointments. They are dark brown of a fetid odor, soluble in alcohol and ether Employed internally in doses of 5 to 20 drops against lupus, angina, asthma, diabetes, etc.; externally in unguental form in the proportion of 1 to 3 parts vaseline or 1 to 5 parts lanoline.

Iodoform bituminate.—This is a preparation of iodoform recently introduced by Dr. Ehrmann of the Vienna clinic. It occurs in brownish micaceous scales, which can be readily powdered, or as a brown powder, and is destitute of any iodoformic odor, retaining but a slight odor of tar. It has been employed chiefly and with gratifying results in the treatment of indolent ulcers; it may be used in all cases where iodoform is indicated.

Iodol.—A pale yellowish-brown powder, used as a substitute for iodoform. It is insoluble in water, but soluble in alcohol and fixed oils. Also given internally for same purposes as iodide of potassium is given for, in doses of one or two grains, in pill form.

Mercury carbolate.—This occurs in colorless crystals, very slightly soluble in water and alcohol. It was introduced against syphilitic affections, being claimed to be safer than other mercurials.

The dose is ¼ to ½ grain; best mixed with powdered licorice and made into pills.

Merbury salicylate.—First introduced in the medical profession in 1881. it has of late years found a gradually increasing field of application and usefulness. It rarely, if ever, produces intestinal irritation, nor does it cause stomatitis, unless taken in very large doses. Naturally it has found its greatest field of usefulness in syphilitic cases; internally, as an injection, and as acollyrium. For topical application it is mixed with vaseline 10 to 30 grs. to one ounce of vaseline. Internally it is given in pill form in doses of 1-5 grain three to four times a day. It has found a wide application in the diseases of the eye.

Methylal.—An etheral colorless liquid, readily soluble in water, alcohol and fixed oils. As a hypnotic, fifteen to thirty minims. Externally as a local anæsthetic in form of ointment or liniment, both of which should be dispensed in tightly-stoppered vessels, owing to the extremely volatile nature of methylal.

Mollin.—An oleo-saponaceous ointment base, white, of the consistency of lard; does not melt even in the warmest climate. It may be easily washed off the skin, whether in its pure state or mixed with ichthyol, Peruvian balsam and the like.

Naphthaline.—Colorless crystals possessing odor of coal gas, insoluble in water, sparingly soluble in alcohol and fixed oils, but readily soluble if heated with these solvents. Used internally for typhoid fever; dose two to eight grains, and externally in skin diseases. Also used to destroy moths and other small insects.

Naphthole.—Occurs in crystalline scales, insoluble in water, soluble in alcohol and fixed oils.

Used externally as ointment or alcoholic solution in treatment of skin diseases. The ointment is made by dissolving the naphthole in the melted base, one in twenty or one in ten, the stronger being especially beneficial in itch. The solution (one in forty) is used as a antiseptic wash for the skin.

PHENACETINE.—White crystalline powder, nearly insoluble in water, soluble in alcohol, perfectly tasteless antipyretic from three to twenty grains may be given. In neuralgia it is also useful, and is given in the same doses. Best given in powder form or in capsules.

PYOKTANIN.—blue.—[Powder.—Sol. in 30 *boiling*, 50 *hot*, 75 *cold* W.; 12 of 90 per cent. A. (forming a *salut.* which *may be diluted ad libitum* with W. without causing precipation), 50 Gl., C.; insol. in E. Callodion, Benzin.—*Non-poisonous*, *very defusible in the animal fluids*, practically *odorless.*—*External* ANTISEPTIC DISINFECTANT, ANALGETIC, etc.,—(for Surgery, Ophthalmiatria, Otiatria; in Diseases of the Nose and Throat, Malignant Neoplasms, etc.; also for Veterinary Practice.)—APPLIC.:—*pure powder*, *pincil solut.* (1–10 : 1000), etc.—N. B.—PYOKTANIN STAINS are removed by lathering with common soap (rubbing in well), and then washing (or, if need be, brushing) off with Alcohol. PYOKTANIN PENCILS, when broken, are mended by wetting the surface with Water, and pressing them together. PYOKTANIN SOLUTIONS should be kept in *dark bottles*, and should not be used when *more than 3 days* old.]

PARALDEHYDE.—A colorless, limpid fluid, hypnotic. Dose thirty to sixty minims.

PICROTOXINE.—Given in epilepsy in doses of one-eighth to one-sixth grain in aqueous solution.

PYRIDINE.—Colorless fluid, soluble in water and alcohol. Used for inhalation in asthma. A fluid drachm is simply poured on a plate and the vapor inhaled.

RESORCIN.—Colorless crystals, readily soluble in water and alcohol. Internally, as an antipyretic and antifermentative in eight to twenty grain doses; externally as ointment or solution, in treatment of skin diseases and urethral affections.

SACCHARIN.—To make solution, combine it with an alkali, preferably sodic bicarbonate. Acids throw it out of solution.

SALOL.—A white crystalline powder, insoluble in water, soluble in alcohol. Dose ten to thirty grains.

SOZOIDOL.—The substance is found in commerce under this name is a soda salt of iodoparaphenol sulphonic acid, and is a white crystalline solid. It is a substitute for iodoform, used externally as ointment, or the powder sprinkled on the affected parts.

SULPHONAL.—White crystals, practically insoluble in water, more soluble in alcohol and ether. Dose as hypnotic, five to thirty grains one or two hours before bedtime; best given in capsule or in suspension mixture with acacia or tragacanth.

TEREBENE.—Colorless fluid of an aromatic odor, soluble in alcohol. Dose five to fifteen drops.

TERPINE HYDRATE.—Colorless crystalline solid, sparingly soluble in cold, more so in hot water and alcohol. Used in bronchitis and chest troubles. Dose, three to ten grains.

TERPINOL.—A colorless, oily liquid, insoluble in water, soluble in ether and alcohol. Uses similar to those of terpine hydrate. Dose, two grains, best given in capsule, mixed with olive or almond oil. Also may be given in pill form with licorice and glycerite of tragacanth.

THALLINE SULPHATE.—Crystalline, colorless solid, soluble in water, less so in alcohol. Internally, three to eight grains in pills. Gonorrhœa, an injection four to eight grains to an ounce of water, or as bougies with cacao butter.

URETHANE (ETHYL CARBAMIDE).—White crystals, soluble in water and alcohol. Used as a hypnotic, in doses of fifteen to forty grains in capsule, or a draught.

ELEMENTARY CHEMISTRY.

The infinite variety of solid, liquid and gaseous substances of which our earth and atmosphere are composed may be resolved with more or less difficulty into distinct forms of matter appropriately termed Elements, because by no known means can they be further decomposed. Sixty-seven elements have been proved to exist. A few occur naturally in the uncombined state, but the greater number are combined in so subtle a manner as to conceal them from ordinary methods of observation. Thus none of the common properties of water indicate that it is composed of two elements, both gases, but different much from each other.

The art by which this and all other compound substances are resolved into their elements is termed Chemistry.

Persons who practice the art and science of Chemistry are known as Chemists.

The *art* of Chemistry also includes the construction of compounds from elements, and the conversion of substances of one character into those of another. The general principles or leading truths relating to the elements, to the manner in which they severally combine, and to the properties of the compound substances formed by their union constitute the *science* of Chemistry.

From these few words concerning the nature of the art and science of Chemistry it will be seen that in most of the occupations that engage the attention of man, Chemistry plays an important part, and in few more so than in the practice of Pharmacy.

Air, water, food, drugs and chemicals, in short, all substances, are composed of a few elements. An intimate knowledge of the properties of these, and of the various substances they form by combining with each other, a knowledge of the power or force by which the elements contained in those compounds are held together, and an application of such knowledge to Pharmacy, must be the object sought to be attained by the learner, for whom this work has been written. Of the sixty-seven known elements, about one-half are of pharmaceutical interest; of these about two-thirds are metals and one-third non-metals; the remainder are so seldom met with in nature as to have received no practical application either in medicine or art. Before intimately studying the elements it is desirable to acquire some general notions concerning them.

Each elementary substance has a symbol (or a short-hand character), which usually is a capital letter, or a capital and one small letter.

It has four functions:

1. It is a short-hand for the *name* of the element.
2. It represents one *atom* of the element.
3. It stands for a constant *weight* of the element —the atomic weight or combining weight.
4. Symbols represent single and equal *volumes* of gaseous elements.

A Chemical Compound is one in which definite weights of two or more elementary substances have combined, and during combination have undergone an entire change of properties. A compound in pharmacy is an intimate mixture of substances, but still only a mixture; it is not a *chemical* compound, the ingredients have not entered into *chemical* union or combination,

Chemical Force, like other forces, cannot be described, for, like them, it is only known by its effects. It is distinguished from other forces by the facts that,

First, it produces an entire change of properties in the bodies on which it is exerted, and,

Second, that it is exerted only between definite weights and volumes of matter. Like the *force of cohesion*, which is the name given to the attraction which molecules have for each other, and which is great in solids, small in liquids, and apparantly absent in gases, and like the *force of adhesion*, which is the name given to the attraction which a mass of molecules has for another mass, *the chemical force* acts only within immeasurable distances: indeed inasmuch as the chemical force appears to reside in atoms, that is to say is exerted inside a molecule while all other forces affect entire molecules, the chemical force may be said to be distinguished;

Third by being exerted within a smaller distance than that which any other force is exerted.

Laws Regulating Chemical Combination—First. A definite compound always contains the same elements and the same proportions of those elements—by weight or volume.

Second. When two elements unite in more than one proportion, they do so in simple multiples of that proportion.

Third. The proportions in which two elements unite with a third are the proportions in which they unite with each other.

CHEMICAL ACTION.—By acting *chemically* what is meant is *so affecting each other that the substances are greatly altered in properties.* A *mixture* of oxygen and hydrogen is still a gas; *a chemical compound* of oxygen and hydrogen is a liquid, namely, water; here is a great alteration in leading properties. Iodine is only slightly soluble in water, and forms a brown-colored solution, and iron is insoluble; but when iodine and iron are *chemically* combined, the product is very soluble in water, forming a light-green solution in which the eye can detect neither iodine nor iron, and which is utterly unlike iron or iodine in any one of their properties.

Tartaric acid, carbonate of sodium, and water added to each other, form a *chemical compound*, containing neither tartaric acid nor carbonate of sodium, these bodies having attacked each other and formed fresh combinations. These illustrations show that *chemical* action is distinguished from all other actions by (*a*) producing an entire change of properties in the bodies on which it is exerted. Chemical action is further distinguished by (*b*) the fact that it only takes place between definite weights and volumes of matter. This (*a* and *b*) cannot be said of any other action—the action of any of the other great forces of nature (gravitation, heat, light, electricity, etc.); hence the statements (*a* and *b*) furnish a sharp and precise definition of *chemical* action or the chemical force.

ATOMS.—In a chemical compound, what has become of the constituents? Let the reader place before him specimens of sulphur, iron, and sulphide of iron. In the sulphide of iron what has become of the sulphur and of the iron from which it was made? The *mixture* of sulphur and iron in *combining* to form sulphide of iron has not lost weight, and, indeed, by certain processes it is possible to recover its sulphur as sulphur, and its iron as iron: so that we are compelled to believe, we cannot avoid the conclusion, that sulphide of iron contains particles of sulphur and of iron. But how small must be those particles! No yellow particle is visible, not the minutest portion of lustrous metal, but dull brown miniature fragments of the original mass. The elementary particles of sulphur and iron, or of the elements in any other compound are, in short, too small to be seen. The mind cannot conceive of a particle of anything (sulphur, iron, sulphide of iron, or what not) so small but what the next instant the imagination has divided it. Yet we must have some common platform on which to reason and converse. The difficulty is met by speaking of these inconceivably small particles as *atoms*. It is an expedient not perhaps altogether satisfactory, but is the only one possible to the majority of minds in the present state of knowledge and education. We cannot speak of iodine aud iron uniting lump to lump, as two bricks are cemented together or blocks of wood glued together, for such is not the kind of action. We cannot select a minute fragment of each to regard as the combining portions, for the minutest fragment we could obtain is visible. And yet iodide of iron contains both iodine and iron, or, at least, a given weight of the compound is obtained from the same weight of the constituents, and the same weight of constituents is obtainable from an equal weight of the compound. We might say that molecules are concerned in the operation, but molecules mean little masses of—of what? There is positively no word left with which to carry on conversation and description but *atoms*. Any other mode of treating the matter is too subjective for general employment. Moreover, any difficulty in forming a definite conception of an atom is met by regarding an atom, not necessarily as something which *cannot* be divided, but as "a particle of matter which undergoes no further division *in chemical metamorphoses.*

THE CHEMICAL FORCE.—What power binds the atoms of a chemical compound together in such marvelous closeness of union that in the couple or group they lose all individuality? Clearly an attractive force of enormous powder, a force remotely resembling, perhaps, that which attracts a piece of iron to a magnet. Were not this force thus all-powerful, the carbon in wood would show its blackness and other qualities, and the hydrogen and oxygen give indications of their gaseous and other characters. This attractive force is commonly termed the *chemical force*, sometimes *chemical affinity*.

MOLECULES.—An atom free and uncombined cannot exist in a state of isolation, at common temperatures, for any appreciable length of time. For we must regard an atom as the home of an attractive force of great intensity, and the moment such an atom is liberated from a state of combination, it finds itself in proximity to another atom having similiar desires for union, so to speak; the result is an impetuous rushing together and formation of either couples, trios, or groups, according to the nature of the atoms. It is doubtless possible to keep some pairs of atoms apart by the aid of heat, just as the magnet and steel may be parted by a superior amount of force, but such a condition of things is probably abnormal. These pairs and other groups of atoms are conveniently designated by the one word *molecule*. Dissimilar kinds of atoms seem to have greater attraction to each other than similar kinds; for, first, the masses of matter met with in nature in the great majority of cases contain two or more dissimilar elements; and, secondly, at the moment certain elements are liberated from their combination, they are very specially active in combining with other, different elements; that is to say, the changes are not equal that the liberated elements will either retain their elementary condition or combine to form compounds, but the cases, in which compounds are formed are in great majority.

CHEMICAL NOTATION, (From *noto*, I mark) — Is the art or practice of recording chemical facts by short marks, letters, numbers, or other signs. Already the first capital letter or the first and one of the small letters of the Latin names of the elements have been employed as contractions, or short-hand expressions, or *symbols* of the whole *name*. Thus H has been used for the word "hydrogen," and Cl for "chlorine." A *second function* of such a symbol is that of indicating one *atom*. Thus H stands not only for word or substance "hydrogen," but for one atom of hydrogen. Large and small figures (2 or $_2$) indicate a corresponding number of atoms, the small figure only multiplying the one particular symbol to which it is attached, while a larger figure multiplies all the symbols it precedes. Thus H_2 means two atoms of hydrogen, and Cl_2 two atoms of chlorine; while $2HCl$ means two atoms of hydrogen and two atoms of chlorine, or, in one word, two molecules of hydrochloric acid.

The *position* of symbols counts for something. Thus HCl indicates not only the substances hydrogen and chlorine, single atoms of each of the substances, but also that the two substances are *joined together by the chemical force*. If the two letters were placed one under the other, or at some distance apart, or were separated by a comma or a plus sign (+), they would be undertood to mean a mere mixture of the elements; but placed as close as the printer's types will conveniently and consistently allow, they must be considered to stand for a compound of the elements, that is to say, hydrochloric acid gas (HCl). The collection of symbols representing a molecule is termed a *formula.*

A Chemical Formula represents a *molecule* either of an element or of a compound. It has four other functions:

1. It indicates at a glance the *names* of the elements in a molecule.
2. Its symbol or symbols, together with a small figure attached to the foot of any symbol, show the *number of atoms* in the molecule.
3. It stands for a constant weight of a compound — the molecular weight — the sum of the combining *weights* or of the weights of the atoms in the molecule.
4. It represents *two volumes* of the substance, if volatilizable, in the state of gas or vapor, and the number of volumes of gaseous elements from which two volumes of any gaseous compound were obtained.

H_2, Cl_2 and HCl are the *formulæ* of hydrogen, chlorine, and hydrochloric acid gas.

$$H_2+Cl_2=2HCl.$$

Such a set of letters, figures, and marks as that on the preceding line is collectively termed an *equation*, because it indicates the equality of the number and nature of the atoms before and after chemical action. On the left hand of the sign of equality are shown two molecules, and on the right hand two molecules; but, of the molcules on the left one contains two atoms of hydrogen and the other two atoms of chlorine, while of the molecules on the right each contain one atom of hydrogen and one of chlorine. The equation forms a short and convenient plan of recording the facts of experiment.

Nature does not always permit man to mix things in any proportion he pleases. She does sometimes, if he only uses the attractions of adhesion or cohesion in binding the material together; but if he employs chemical attraction, she restricts him to special proportions. That is to say, if the things mixed do not attack one another or intimately combine then admixture may be effected in any proportion; and the mixture is a mere mixture having the mean properties of its components.

When compounds unite to form definite chemical substances, they always combine in the same proportions.

A definite compound always contains the same elements in the same proportions.

While many substances only unite chemically in one proportion, others combine in two or even more.

When two elements unite in more than one proportion, the resulting compounds contain, to a constant proportion of one element, simple multiple proportions of the other—or the weights of the constituent elements bear some similar simple relations to each other.

ATOMIC WEIGHTS.—It is a fact, that, when elements unite with one another in the peculiar and intimate manner termed chemical, they do not combine in the haphazard proportions of a mere mixture, but in one fixed and constant proportion. Such proportions or weights represent the weights of their atoms. Oxygen unites with other elements in proportions of 16, therefore 16 is the weight of the atom of oxygen. Chlorine unites with other elements in proportions of 35½, therefore 35½ is the atomic weight of chlorine. And for a similar reason the atomic weights of hydrogen will be 1, carbon 12, and iodine 127. It will be understood that these are the *relative* weights of atoms, for we cannot know the absolute weights. All that is known is that the chlorine atom, for instance, is 35.5 times as heavy as the hydrogen atom, whatever the absolute weight of the latter may be, and the iodine atom 127 times as heavy. The quantity of metal which with 35.5 of chlorine will form a chloride, will require 127 of iodine to form an iodide.

QUANTIVALENCE OF ATOMS.—Turning from the *weights* of atoms, their *value* may now be considered; *quantivalence* may be stated. The chemical value of atoms in relation to each other, may be compared to the exchangeable value of coins. As compared with a dime, the twenty cent piece would be two valued and the fifty cent piece five valued. Here again, hydrogen is conveniently adopted as the standard of comparison. Chlorine, iodine, and bromine, as well as potassium, sodium, and silver among the metals, are, like hydrogen, univalent (u-niv'-a-lent, from *unus*, one, and *valens*). An atom of oxygen in its relations to an atom of hydrogen is bivalent (pronounced thus, biv'-a-lent, of double worth, from *bis*, twice, and *valens*); an atom of it will displace two atoms of hydrogen, or combine with the same number; nitrogen is usually trivalent (triv'-a-lent; from *tres*, three, and *valens*); and carbon, quadriv-a-lent (from *quatuor*, four, or *quater*, four times, and *valens*). Phosphorus, arsenicum, antimony, and bismuth, like nitrogen, usually exhibit trivalent properties; but the composition of certain compounds of these five elements shows that the several atoms are sometimes quinquivalent (quin-quiv-a-lent; *quinquies*, five times). Sulphur, chromium, manganese, iron, cobalt, and nickel are sexivalent (sex-iv'-a-lent, from *sex*, six, or *sexies*, six times, and *valens*), but frequently exert only bivalent, trivalent, or quadrivalent activity.

Roman numerals I, II, III, IV, V, VI, are attached to the symbols of each element to indicate atomic univalence, bivalence, trivalence, quadrivalence, quinquivalence, or sexivalence. Dashes (H', O'', N''') similar to those used in accentuating words are often used instead of figures in expressing quantivalence. The quantivalence of elements, as they one after another come under notice, should be carefully committed to memory; for the composition of compounds can often be thereby predicted with accuracy and remembered with ease.

TABLE OF ELEMENTARY SUBSTANCES.

	Symbols and atomic value.
Aluminium (Al_2^{VI})	Al^{I}
Antimony (Sb^{III})	Sb^{V}
Arsenicum (As^{III})	As^{V}
Barium	Ba^{II}
Beryllium (Glucinum)	Be^{II}
Bismuth (Bi^{III})	Bi^{V}
Boron	B^{III}
Bromine	Br^{I}
Cadmium	Cd^{III}
Cæsium	Cs^{I}
Calcium	Ca^{II}
Carbon (C^{II})	C^{IV}
Cerium (Ce^{III})	Ce^{VI}
Chlorine	Cl^{I}
Chromium (Cr_2^{VI})	Cr^{VI}
Cobalt (Co^{II})	Co^{VI}

Copper	Cu^{II}
Davyum?	
Decipium?	Dp^{II}
Didymium	D^{III}
Erbium?	Eb^{II}
Flourine	F^{I}
Gallium	Ga^{IV}
Gold (Au^{I})	Au^{III}
Hydrogen	H^{I}
Ilmenium?	Il^{V}
Indium	In^{VI}
Iodine	I^{I}
Iridium	Ir^{IV}
Iron (Fe^{II} & Fe_2^{VI})	Fe^{VI}
Lanthanum	La^{II}
Lavoisium?	
Lead ($^{II}Pb^{II}$)	Pb^{IV}
Lithium	L^{I}
Magnesium	Mg^{II}
Manganese (Mn^{II} & Mn^{IV})	Mn^{VI}
Mercury	Hg^{II}
Molybdenum	Mo^{VI}
Mosandrum	
Neptunium	Np^{V}
Nickel (Ni^{II})	Ni^{VI}
Niobium	Nb^{V}
Nitrogen (N^{I} & N^{III})	N^{V}
Norwegium	
Osmium	Os^{IV}
Oxygen	O^{II}
Palladium	Pd^{IV}
Philippium?	Pp^{II}
Phosphorous (P^{III})	P^{V}
Platinum	Pt^{IV}
Potassium	K^{I}
Rhodium	Rh^{IV}

Rubidium	Rb^{I}
Ruthenium	Ru^{IV}
Scandium	
Selenium or Selenion	Se^{VI}
Silicon	Si^{IV}
Silver	Ag^{I}
Sodium	Na^{I}
Strontium	Sr^{II}
Sulphur (S^{II} & S^{IV})	S^{VI}
Tantalum	Ta^{V}
Tellurium	Te^{VI}
Terbium?	Tb^{II}
Thallium	Tl^{III}
Thorinum or Thorium	Th^{II}
Tin (Sn^{II})	Sn^{IV}
Titanium	Ti^{IV}
Tungsten	W^{VI}
Uralium	
Uranium	U^{VI}
Vanadium	V^{V}
Ytterbium?	Yb
Yttrium	Y^{II}
Zinc	Zn^{II}
Zirconium	Zi^{II}

ACIDULOUS RADICALS.

Before leaving the subject of elementary chemistry we will mention the Acidulous Radicals, of which we give a table below, together with their quantivalence. These elements and compounds are termed *radicals*, each being the common *root* (*radix*) in a series of salts. Why compound radicals (as NO_3, SO_4, PO_4, etc.) differ in quantivalence cannot well be explained. Their constituent atoms doubtless always exert the same amount of attractive force, nearly but not quite all this force being exerted in retaining the atoms in one group, and the remainder probably determining the quantivalence. Some of the compound radicals are obtainable in the free state, others have yet to be proved capable of isolated existence.

These radicals unite with bases to form salts, which are called Chlorides, Bromides, Iodides, &c., according to the radical. The chemical formulæ and quantivalence of these radicals should be thoroughly learned, and then when speaking of a salt one will understand that it is the result of the union of a base with a certain radical.

FORMULÆ AND QUANTIVALENCE OF SOME OF THE ACIDULOUS RADICALS:

All Chlorides contain	Cl	Univalent radicals.
All Bromides contain	Br	
All Iodides contain	I	
All Cyanides contain	CN	
All Hydrates contain	HO	
All Nitrates contain	NO_3	
All Chlorates contain	ClO_3	
All Acetates contain	$C_2H_3O_2$	
All Oxides contain	O	Bivalent radicals.
All Sulphides contain	S	
All Sulphites contain	SO_3	
All Sulphates contain	SO_4	
All Carbonates contain	CO_3	
All Oxalates contain	C_2O_4	
All Tartrates contain	$C_4H_4O_6$	
All Citrates contain	$C_6H_5O_7$	Trivalent radicals.
All Phosphates contain	PO_4	
All Borates contain	BO_3	

RECAPITULATION.

An Atom of any element is a particle so small that it undergoes no futher subdivision in chemical transformations.

A Molecule is the smallest particle of matter that can exist in a free state.

A Solid is a substance, the molecules of which are more or less immobile, though probably not in absolute contact.

A Liquid is a substance the molecules of which so freely move about each other that it readily assumes and retains the form of any vessel in which it is placed.

A Gas is a substance the molecules of which are so far apart that they seem to have lost all attraction for each other, and, indeed, to have acquired the property of repulsion to such an extent that they are only prevented from receding to a still greater extent by the pressure of surrounding matter. Motion is especially characteristic of gaseous fluids.

Atomic Weights are, first, the proportions in which elements are found to combine with each other by weight. (The figures showing these proportions are purely relative, but all chemists agree to make this relation fixed by giving the number 1 to hydrogen.) Secondly, they are the weights of equal volumes of elements in the state of gas (relative to 1 of hydrogen).

Molecular Weights—These are the weights of equal volumes of gases or vapors, under equal circumstances of temperature and pressure, and relative not to 1, but to 2 of hydrogen. In the case of non-volatile bodies, molecular weight is deduced from the observed analogies of the bodies with those whose molecular weight admits of proof. The molecular weight of a compound is the sum of the atomic weights.

THE INORGANIC COMPOUNDS.

The inorganic elements and officinal compounds may be classified as follows:—

(Compounds to be classed under the metallic or basic elements.)

The Inorganic Bases.

ALKALIES: Potassium; Sodium; Lithium; Ammonium.

ALKALINE EARTHS: Barium; Calcium; Magnesium; (Strontium).

ARSENIC GROUP: Arsenic; Antimony; Bismuth.

UNGROUPED: Zinc; Lead; Silver; Gold; Platinum; (Copper and Mercury); (Iron; Manganese and Chromium); Aluminium; Cerium.

Non-metallic Elements.

HALOGENS: Chlorine; Bromine; Iodine.

UNGROUPED: Hydrogen; Nitrogen; Oxygen Sulphur; Phosphorus; Carbon; Boron; Silicon.

The Inorganic Acids.

Hydrochloric; Hydrobromic; Nitric; Nitro-hydrochloric; Sulphuric; Sulphurous; Phosphoric; Boric; Arsenious; Chromic.

CHEMICAL EQUATIONS.

Illustrating the manufacture of some of the most important inorganic acids and salts.

Acidum Nitricum, HNO_3:—

$NaNO_3$	+	H_2SO_4	=	$NaHSO_4$	+	HNO_3.
Sodium Nitrate.		Sulphuric Acid.		Acid Sodium Sulphate.		Nitric Acid.

Acidum Nitrohydrochloricum:—

HNO_3	+	$3HCl$	=	$NOCl$	+	Cl_2	+	$2H_2O$
Nitric Acid.		Hydrochloric Acid.		Nitrosyl Chloride.		Chlorine.		Water.

Acid Sulphuricum, H_2SO_4:—

$2SO_2$	+	N_2O_4	=	$2SO_3$	+	N_2O_2.
Sulphurous Oxide.		Nitrogen Textroxide		Sulphuric Oxide.		Nitrogen Dioxide.

then

N_2O_2	+	O_2	=	N_2O_4;
Nitrogen Dioxide.		Oxygen (from air, etc.).		Nitrogen Tetroxide.

(Continously furnishing O_2 as above and converting SO_2 into SO_3.)

then

SO_3	+	H_2O	=	H_2SO_4.
Sulphuric Oxide.		Water		Sulphuric Acid.

Acidum Sulphurosum. SO_2:—

$4H_2SO_4$	+	C_2	=	$4SO_2$	+	$2CO_2$	+	$4H_2O$.
Sulphuric Acid.		Carbon,		Sulphurous Anhydride.		Carbon Dioxide.		Water,

Acidum Phosphoricum, H_3PO_4:—

$12P$	+	$20HNO_3$	+	$8H_2O$	=	$12H_3PO_4$	+	$20NO$.
Phosphorus.		Nitric Acid.		Water.		Phosphoric Acid.		Nitrogen Oxide.

Acidum Hydrochloricum, HCl:—

$2NaCl$	+	H_2SO_4	=	HCl	+	$NaCl$	+	$NaHSO_4$.
Sodium Chloride.		Sulphuric Acid.		Hydrochloric Acid.		Sodium Chloride.		Acid Sodium Sulphate.

$NaCl$	+	$NaHSO_4$	=	HCl	+	Na_2SO_4.
Sodium Chloride.		**Acid Sodium Sulphate.**		**Hydrochloric Acid.**		**Sodium Sulphate.**

Argenti Nitras, $AgNO_3$.

Ag_3	+	$4HNO_3$	=	$3AgNO_3$	+	NO	+	$2H_2O$.
Silver.		**Nitric Acid.**		**Silver Nitrate.**		**Nitrogen Monoxide.**		**Water.**

Acids with names ending in "ic" unite with bases to form "ate" salts.

Zinci Sulphas, $ZnSO_4$.

$2Zn$	+	$2H_2SO_4$	+	H_2O	=	$2ZnSO_4$	+	$4H$	+	H_2O.
Zinc.		**Sulphuric Acid.**		**Water.**		**Zinc Sulphate.**		**Hydrogen.**		**Water.**

Hydrargyri Chloridum Mite, Hg_2Cl_2.

$2H_2SO_4$	+	Hg	=	$HgSO_4$	+	SO_2	+	$2H_2O$.
Sulphuric Acid.		**Mercury.**		**Mercuric Sulphate.**		**Sulphurous Acid.**		**Water.**

$HgSO_4$	+	Hg	=	Hg_2SO_4.
Mercuric Sulphate.		**Mercury.**		**Mercurous Sulphate.**

Hg_2SO_4	+	$2NaCl$	+	High heat	=	Hg_2Cl_2	+	Na_2SO_4.
Mercurous Sulphate.		**Sodium Chloride.**		**(Sublimation.)**		**Mercurous Chloride.**		**Sodium Sulphate.**

Potassii Chloras, $KClO_3$.

$3Ca(OCl)_2$	=	$2CaCl_2$	+	$Ca(3OCl)_2$.
Calcium Hypochlorite.		**Calcium Chloride.**		**Calcium Chlorate.**

$Ca(3OCl)_2$	+	$2KCl$	=	$2KClO_3$	+	$CaCl_2$.
Calcium Chlorate.		**Potassium Chloride.**		**Potassium Chlorate.**		**Calcium. Chloride.**

Soda, NaHO

Caustic Soda.

Na_2CO_3	+	$Ca(HO)_2$	=	$2NaHO$	+	$CaCO_3$.
Sodium Carbonate.		**Calcium Hydrate.**		**Caustic Soda.**		**Calcium. Carbonate.**

The direct union of two elements form salts with names ending in "ide."

Ammonii Bromidum, NH_4Br.

$$\underset{\text{Bromine.}}{6Br} + \underset{\text{Ammonia.}}{8NH_3} = \underset{\text{Ammonium Bromide.}}{6NH_4Br} + \underset{\text{Nitrogen.}}{N_2}.$$

Potassii Iodidum, KI

$$\left\{\begin{array}{l} \underset{\text{Potassium Hydrate.}}{6KOH} + \underset{\text{Iodine.}}{(I_2)_3} = \underset{\text{Potassium Iodide.}}{5KI} + \underset{\text{Potassium Iodate.}}{KIO_3} + \underset{\text{Water.}}{3H_2O}. \\ 10KI + 2KIO_3 + 3C_2 = 12KI + 6CO. \end{array}\right.$$

Calcii Chloridum, $CaCl_2$.

$$\underset{\text{Calcium Carbonate,}}{CaCO_3} + \underset{\text{Hydrochloric Acid.}}{2HCl} = \underset{\text{Calcium Chloride.}}{CaCl_2} + \underset{\text{Carbon Dioxide.}}{CO_2} + \underset{\text{Water.}}{H_2O}.$$

ELEMENTARY GASES (H,N,O,Cl).

What are the elementary gases, and their physical properties?

Hydrogen, Oxygen and Nitrogen are colorless, odorless and tasteless. Chlorine is a yellowish-green gas, of suffocating odor.

ORGANIC ACIDS.

Acidum Aceticum Glaciale $HC_2H_3O_2$

$$\underset{\text{Sodium Acetate.}}{NaC_2H_3O_2} + \underset{\text{Sulphuric Acid.}}{H_2SO_4} = \underset{\text{Glacial Acetic Acid.}}{HC_2H_3O_2} + \underset{\text{Acid Sodium Sulphate.}}{NaHSO_4}$$

Potassii Acetas, $KC_2H_3O_2$

$$\underset{\text{Potassium Bicarbonate.}}{KHCO_3} + \underset{\text{Acetic Acid}}{HC_2H_3O_2} = \underset{\text{Potassium Acetate.}}{KC_2H_3O_2} + \underset{\text{Carbon Dioxide.}}{CO_2} + \underset{\text{Water.}}{H_2O}.$$

Acidum Citricum, $H_3C_6H_5O_7\ H_2O$.

Obtained from the juice of limes and lemons.

Potassii Citras, $K_3C_6H_5O_7 H_2O$.

$$\underset{\text{Potassium Bicarbonate.}}{3KHCO_3} + \underset{\text{Citric Acid.}}{H_3C_6H_5O_7} = \underset{\text{Potassium Citrate.}}{K_3C_6H_5O_7} + \underset{\text{Water.}}{3H_2O} + \underset{\text{Carbon Dioxide.}}{3CO_2}.$$

Acidum Tartaricum, $H_2C_4H_4O_6$.

Made by purifying argols, and converting the cream of tartar into a calcium salt by means of $CaCO_3$ and CaCl, decomposing the resulting Ca, tartrate with diluted H_2SO_4 and allowing the filtered solution to crystallize.

Acidum Benzoicum, $HC_7H_5O_2$

Found naturally in benzoin, balsam of peru and other resinous substances.

Ammonii Benzoas, $NH_4C_7H_5O_2$

$$\underset{\text{Benzoic Acid.}}{HC_7H_5O_2} + \underset{\text{Water of Ammonia.}}{HN_4HO} = \underset{\text{Ammonium Benzoate.}}{NH_4C_7H_5O_2} + \underset{\text{Water.}}{H_2O}.$$

Acidum Tannicum, $C_{14}H_{10}O_9$

Tannic acid exists in many vegetable substances, such as oak bark, salix, kino, catchu, etc., but the officinal acid is obtained from nutgalls.

CHEMICAL FORMULÆ.

We give below a few Chemical Formulæ which are in common use in Pharmaceutical Literature, and should be learned.

Acid Boric	H_3BO_3
Acid Carbonic	H_2CO_3
Acid Hydrochloric	H Cl
Acid Nitric	HNO_3
Acid Nitrous	HNO_2

Acid Phosphoric	H_3PO_4
Acid Sulphuric	H_2SO_4
Acid Sulphurous	H_2SO_3
Alcohol	C_2H_5OH
Ammonia	NH_3
Camphor	$C_{10}H_{16}O$
Chloroform	$CHCl_3$
Glycerin	$C_3H_5(OH)_3$
Lime	$Ca\,O$
Mercuric Chloride (corr. Sublim.)	$Hg\,Cl_2$
Mercurous Chloride (Calomel)	$Hg_2\,Cl_2$
Potassium Iodide	KI
Potassium Bromide	$K\,Br$
Potassium Bicarbonate	$K\,H\,CO_3$
Caustic Potash	KOH
Prussic Acid	HCN
Silver Nitrate	$Ag\,NO_3$
Sodium Bicarbonate	$Na\,HCO_3$
Sodium Chloride (common salt),	$Na\,Cl$
Strychnine	$C_{21}H_{22}N_2O_2$
Sugar	$C_{12}H_{22}O_{11}$
Sulphur	S
Water	H_2O

Miscellaneous Questions

—ON—

Pharmacy, Botany and Chemistry.

What is a Pharmacopœia? A book containing a selection of medical substances, with formulas for their preparation. The official ones are all issued under the authority of the respective governments.

When was the first Pharmacopœia of the U. S. issued? In 1830.

What is Pharmacy? The science of preparing medicines.

What is Therapeutics? The science of applying medicines.

What is Materia Medica? The science which treats of the substances used as medicine.

What term is used to embrace these three divisions? Pharmacology.

How would you measure heat? By the thermometer

What two thermometers in common use?

Fahrenheit and Centigrade.

Give boiling and freezing points of each.

Fahrenheit—Freezing Point, 32; boiling 212.
Centigrade—Freezing Point, 0; Boiling 100.

What is the size of a drop? Erroneously, a drop is supposed to be a minim; but though this may be approximately true when applied to water, it is not true in regard to any other liquid. Thick, viscous liquids produce large drops; heavy mobile liquids small ones. A drop of syrup of acacia is five times as large as a drop of chloroform. The shape and surface from which the drop is poured also influences its size.

How many minims in an ounce of water? Four hundred and eighty.

What is the weight in grains of one fluid ounce of distilled water at ordinary temperature?

455.7 grains.

What is meant by the maximum and minimum dose?

Minimum—Smallest ordinary dose.

Maximum—Largest dose that can be given with safety.

Why are some drugs macerated before they are percolated? To afford the menstruum time to dissolve the active ingredients.

What is used to adulterate beeswax? Paraffin, meal, resin, white lead.

Give rules to proportion the dose of medicine for children.

Under	1	year	the dose	should be the	$\frac{1}{12}$	adult	dose.
“	2	“	“	“	$\frac{1}{8}$	“	“
“	3	“	“	“	$\frac{1}{6}$	“	“
“	4	“	“	“	$\frac{1}{4}$	“	“
“	7	“	“	“	$\frac{1}{3}$	“	“
“	14	“	“	“	$\frac{1}{2}$	“	“
“	17	“	“	“	$\frac{2}{3}$	“	“

Why are the numbers 50, 60, etc., employed to represent the fineness of powders?

They represent so many meshes to the linear inch in the sieve through which the powder must pass.

What is meant by the term magma? It is applied to the moist precipitate as it is collected in a filter before it is dried.

How can the character of precipitates be modified? Hot dense solutions produce heavy precipitates, cold and dilute solutions produce light precipitates.

How are soluble salts obtained in crystals? By slowly evaporating the solvent from a saturated solution.

What other methods are used for obtaining crystals? Sublimation and fusion.

How is a crystal bounded? By plane surfaces symmetrically arranged with reference to certain imaginary lines passing through its centre, these lines are called axes.

What is the source and symbol of zinc? Found in nature as sulphide (blende) or carbonate (calamine) Symbol, Zn.

What is the chemical and physical difference between the red and yellow oxide of mercury? The difference is only physical, the yellow being in a more minute state of division than the red.

Give numbers of the officinal powders and their meaning.

No. 20—Coarse.
No. 40—Moderately coarse.
No. 50—Moderately fine.
No. 60—Fine.
No. 80—Very fine.

What is meant by an Impalpable Powder? One which is reduced to the utmost fineness.

What is the meaning of assay?

To determine the quantity of a given substance in a compound.

Define analysis.

Analysis is breaking up a compound and separating its constituents.

Define synthesis.

Synthesis is the creation or preparation of compounds by building them up from their constituent elements.

What is a sulphide?

It is a salt formed by the direct union of two elements, one being sulphur.

What is a Sulphite?

It is a salt formed by the action of Sulphurous Acid on a base.

What is a Sulphate?

It is a salt formed by the action of Sulphuric Acid on a base.

Give three rules governing the formation of salts.

1st.—The direct union of two elements form "ide" salts.

2nd.—Acids ending in "ous" unite with bases to form "ite" salts.

3d. Acids ending in "ic" unite with bases to form "ate" salts.

What are the two grades of Acids? C. P., Chemically Pure, and M. P., Medicinally Pure.

Name menstruums in order of importance? Water, Alcohol, Alcohol Dilute, Acetum and Ether.

What is the heaviest essential oil? Oil of Gaultheria.

What volatile oil contains sulphur? Oil of Mustard.

How many elementary substances are there?

Sixty-seven.

What is an inorganic acid? A mineral acid.

What is an organic acid? An animal or vegetable acid.

What is meant by a Ferrous and a Ferric Salt?

A Ferrous salt is one in which the iron exerts bivalent activity.

A Ferric salt is one in which it exerts trivalent activity.

What salt is formed when the fumes of Hydrochloric Acid come in contact with Ammonia Gas?

Chloride of Ammonia.

What is the difference between Aqua Ammonia and Spirits of Ammonia?

Spirits of Ammonia—Alcoholic Solution .
Aqua Ammonia—Aqueous Solution.

What is Gum Arabic chemically? Gumate of Calcium.

What is a good test for Morphine? Nitric Acid turns it red.

Bromine, Chlorine and Iodine; state physical difference between them. Bromine is a liquid; Chlorine a gas, and Iodine a solid.

What ammoniacal salt is contained in spiritus ammoniæ aromaticus? Carbonate.

How would you detect Corrosive Sublimate in Calomel?

Boil the Calomel in water, filter and pass Sulphureted Hydrogen through the liquid, or add a few drops of test solution of Potassium Iodide. In either case a precipitate indicates the presence of Corrosive Sublimate in the sample.

What officinal preparation contains Carbonate of Iron? Massa Ferri Carb.

From what is Pepsin obtained? From the mucous membrane of the stomach of the hog.

What facilitates the solution of lime in water? Sugar.

How many drops of Tincture Opii represent one grain of Opium? Twenty-two drops or 11 minims.

What is Prussian Blue chemically? Ferrocyanide of Iron.

What is Camphor? A stearopten derived from Cinnamomum Camphora.

What is the officinal Alum? Sulphate of Aluminum and Potassa.

What kind usually sold in stores? Sulphate of Aluminum and Ammonia.

How are Iron preparations protected from change? By the addition of Sugar.

What acid is used in Aconite preparations? Tartaric.

What is used in the Licorice preparations? Ammonia.

Why? To disolve the glycyrrhizin.

What acid used in the Conium preparations? Hydrochloric Acid.

How would you distinguish between a solution of Sulphate of Zinc and a solution of Alum? A Solution of Carbonate of Sodium when added to a solution of Sulphate of Zinc gives a white precipitate of Carbonate of Zinc.

What is a Petal? A Flower Leaf.

What is the difference between dilute alcohol U. S. P. 1870 and 1880?

1870 equal parts by measure.
1880 equal parts by weight.

How many C. C. in a litre? 1,000.

From what is Carbolic Acid obtained? Coal tar products.

From what is Salicylic Acid made? Carbolic Acid.

From what was Salicylic Acid first obtained? Oil of Wintergreen.

How can camphor, resinous and oily substances be formed into pills?

By the use of adhesive pastes, soap and the use of heat.

How are crystalline forms systematically arranged?

Crystals are arranged in six systems, based upon the number and relation of axes, as follows :

Isometric System.—Three equal axes crossing at right angles (ex. cube).

Tetragonal System.—Two axes equal, third unequal, all crossing at right angles (ex., square prism).

Orthorhombic System.—Three unequal axes, but intersections all at right angles (ex., rectangular prism).

Monoclinic System.—Three unequal axes, one intersection oblique (ex , oblique rectangular prism).

Triclinic System.—Unequal axes, all crossing obliquely (ex., oblique rhomboidal prism).

Hexagonal System.—Three equal axes lying in one plane and intersecting at angles of 60°, and a fourth axis crossing each of the others at right angles, and longer or shorter (ex., hexagonal prism).

By the truncation and bevelment of the angles and edges of these fundamental forms a vast variety of secondary forms are produced.

How is commercial bicarbonate of soda purified? By washing with water until the washings give no precipitate with sulphate of magnesium.

What bromide contains the most bromine? Bromide of Lithium.

What is a test for ammonia salts? Heated with alkalies they evolve NH_3.

From what is gallic acid obtained? Nutgalls.

From what is Oleic Acid obtained? By-product in the manufacture of candles and glycerin.

How is Glycerin obtained? Obtained from fats and fixed oils as a by-product in the manufacture of soap.

What are confections? Semi-solid saccharrine preparations.

What is a glucoside? A substance which is converted into glucose by boiling with acids.

From what is Tannic Acid obtained? Nutgalls.

From what is Santonine obtained? Satonica.

What is Litharge? Oxide of lead.

What are soaps? Soaps are salts of fatty acids.

What is Aqua Phagedænica? Yellow Wash.

What is the common name for Liquor Iodi Compositus? Lugol's Solution.

What are Stamens? The male organ of plants.

What is Pollen? The fertilizing powder produced by the stamen.

Why should Acids never be prescribed with Licorice? Acids precipitate the glycyrrhizin of the Licorice.

What is Goulard's Cerate? Ceratum Plumbi Subacetatis.

What is the common name for Plumbi Acetas? Sugar of Lead.

What is an Alkaloid?

Alkaloids are alkaline principals obtained from both the animal and vegetable kingdoms. They are generally the active principles of the drug from which obtained, and are generally crystallizable.

They are divided in two classes: Amines, which are liquids, and Amides, which are solids.

What two ointments should not be made with an iron spatula? Citrine Ointment and Iodine Ointment.

From what is Strychnia principally obtained? Strychnos Ignatia.

Name a preparation incompatible with Fowler's Solution. Tinctura Ferri Chloridi.

What is the officinal strength of Fluid Extracts? One cubic centimetre represents one gramme of the drug.

From what is Citric Acid made? From Lemons and Lime Fruit.

From what is Tartaric Acid obtained? From the Crude Tartar of wine casks.

What is White Vitriol? Sulphate of Zinc.

What is Blue Vitriol? Sulphate of Copper.

What is Sal Soda? Carbonate of Soda.

What is the action of Litharge on Olive Oil? Forms a lead soap and Glycerin.

Define Stigma, and mention a drug that the Pharmacopœia directs shall be composed alone of Stigmas? The Stigma is the tip or some other portion of the style upon which the Pollen falls. Saffron is the Stigmas of crocus sativus.

Name two bitter principles found in Columbo Root. Colombin and Berberine.

How was Glycerin first obtained? As a by-product in the manufacture of Lead Plaster.

What is a Volatile Oil? One made by distillation from vegetable substances.

What is a Fixed Oil? One expressed from vegetable substances.

What is a neutral principal? One which is neither Acid or Alkaline.

Which element is used most in the metallic state in Pharmacy? Mercury.

How are Glycerin suppositories made? By the addition of Soap or Gelatine.

What change was made in Spirits of Camphor in the U. S. P. of 1880? Water was added to the formula.

Name the officinal preparations of Sulphur.

Sulphur Precipitatum,
Sulphur Lotum,
Sulphur Sablimatum,
Sulphuris Iodidum.

To what does Cherry Laurel Water owe its activity? Hydrocyanic Acid.

Why is charcoal used in the preparation of Potassium Iodide? To convert the Iodate into Iodide.

Mention a common impurity in Potassium Bitartrate. Tartrate of Calcium.

What per cent. of Ferric Chloride does Liquor Ferri Chloridi contain? 37.8 per cent.

What per cent. of Ferric Nitrate does Liquor Ferri Nitratis contain? 6 per cent.

What per cent. of Subacetate of Lead does Liquor Plumbi Subacetatis contain? 25 per cent.

What officinal preparation is an antidote for arsenic? Ferri Oxidum Hydratum Cum Magnesia.

Mention the composition of Gum Arabic. Arabin, lime, potassa and magnesium.

What is a Rhizome? A creeping stem or branch growing beneath the surface of the soil, or partly covered by it.

What Soaps are officinal? Green Soap and Castile Soap.

What change takes place when Sulphate of Iron is exposed to the air? Oxysulphate of Iron is formed by the absorption of oxygen.

What salt of Iron is found when Iron is dissolved in Hydrochloric Acid? Ferrous Chloride.

How is Ferric Chloride made? By the addition of Nitric Acid to solution of Ferrous Chloride.

How would you powder Camphor? By the addition of a small quantity of alcohol while rubbing in a mortar.

What is solution? The permanent and complete incorporation of a liquid, solid or a gaseous substance with a liquid. The product is called a *solution*, the liquid used, a solvent, and if the solvent will dissolve no more of the substance, the product is called a *saturated solution*.

What is the difference between simple and chemical solution? In simple solution no change occurs in the chemical structure of the dissolved substance (sugar and water); but in chemical solution the reverse is the case. Ex.—The officinal solution of nitrate of mercury.

How may solution of solids be facilitated? By pulverizing the substance the extent of surface exposed to the solvent is increased, and by agitation the frequency of the contact is augmented, thus favoring the rapidity of solution. Heat, by causing convection currents in the liquid, facilitates solution, and as heat works against cohesion, it increases the solubility of the substance.

May saturated solutions be used as solvents? Yes; a liquid saturated with one substance is still a solvent for another substance.

What effect has solution upon temperature? Simple solution lowers temperature; chemical solution raises temperature.

What change was made in Dover's Powder in the U. S. P. of 1880? Sugar of Milk was substituted for Sulphate of Potassium.

Is the tincture of Chloride of Iron a Ferrous or Ferric Solution? Ferric.

To what extent is Camphor soluble in water? Five grains to the pint.

To what class of preparation do Tannin and Santonin belong? Glucosides.

To what class do Quinine and Morphine belong? Alkaloids.

What nomenclature has been adopted for Alkaloids? The last syllable should terminate in *ine*; the Latin termination in *ina*; the names of neutral principles and glucosides end in *in*.

What is meant by the Habitat of a plant? The locality in which it grows in a wild state.

What Aloes is officinal? Aloe, or Socotrin Aloes.

What is the strength of solution of Morphine of the

British Pharmacopœia? Four grains to the ounce.

What change has been made in the name of Spiritus Lavandulæ Compositus U. S. P. 1870? It was changed to Tinctura Lavandulæ Composita.

Why is HCl used in making purified animal charcoal? To dissolve out the calcium salts.

What acid does Cream of Tartar contain? Acidum Tartaricum.

What is meant by (the signa) to a prescription? The direction to the nurse or patient.

What Volatile Oil is made by destructive distillation? Oil of Amber.

From what is Balsam Tolu obtained? Myroxylon Toluifera.

From what is Balsam Peru obtained? Myroxylon Pereiræ.

What is "Phenol?" Carbolic Acid.

From what does Formic Acid derive its name? "Formica Rufa," from which it was first obtained.

What is the chemical reaction of the Arsenious salts? Acid.

What is Ebullition, or boiling? A violent agitation in a liquid produced when it is heated from the fluid to the gaseous condition. The heat acts first on that portion of the liquid resting against the heated surface, converting a portion into steam, which rises in the form of bubbles that break on the surface of the liquid.

What is meant by the boiling point of a liquid? The temperature at which it boils. Each liquid has its specific boiling point as well as its specific weight. Liquids evaporate more or less at all temperatures, hence there seems to be no specfiic *evaporating* points, but there is a specific point where ebullition commences.

What is meant by Spontaneous Evaporation?

The evaporation of a liquid at the ordinary temperature of the atmosphere.

What is vermillion? Composed principally of red sulphide of mercury.

What is the analytical test for Boric Acid? Alcohol flame turns green and turmeric paper brown.

For what purposes are Barium Salts used? The solution of nitrate and chloride are used as test solutions.

What is meant by (the subscription) to a prescription? The directions to the compounder.

What Acid do Senna Leaves contain? Acidum Catharticum.

What is the difference between a Sediment and a Precipitate?. Sediment is solid matter separated merely by the action of gravity from a liquid in which it has been suspended, A Precipitate, on the other hand, is solid matter separated from a solution by heat, light or chemical action.

What is the meaning of "Amaræ" and "Dulcis"? Bitter and Sweet.

What is the action of sulphuric, nitric, and hydrochloric acids on organic substancs? Destroys them.

What two acids are found in Opium combined with the Alkaloids? Meconic and Lactic Acids.

How many Alkaloids does Opium contain? Nineteen, of which the most important is Morphine.

What is the difference between Prepared and Precipitated Chalk? Prepared chalk is merely chalk freed from most of its impurities, and generally moulded into conical-shaped lumps. Precipitated Chalk is made by precipitating a solution of Chloride of Calcium with a solution of Carbonate of Soda.

What per cent. of officinal Sulphuric Acid in Aromatic Sulphuric? 20 per cent.

What is Basilicon Ointment? Ceratum Resinæ.

What is Deshler's Salve? Compound Resin Cerate.

What is the best menstruum for extracting a drug? The best menstruum for extracting a drug is one that will deprive it of its active and desirable principles, and leave in the residue those principles which are either inert or objectionable.

What is Blue Ointment? Unguentum Hydrargyri.

What is used for (the superscription) in French prescriptions? The letter P., meaning prenez (take).

What group of atoms are characteristic of all carbonates? CO_3

What advantages do Tinctures possess over Fluid Extracts? First, in some cases the alcohol menstruum of the tincture is to be desired; second, tinctures may be added in small proportions to aqueous preparations, without serious precipitation.

From what is Iodine obtained? From the ashes of seaweed, and from the mother-liquor obtained from the crystallization of sodium nitrate in South America, in which it occurs in the forms of sodium iodide and iodate.

What foreign substances are occasionally found in urine? Sugar, Albumen, Bile and Pus.

What is Monsell's solution? Liquor Ferri Subsulphatis.

What two strengths of Acetic Acid are found in commerce? The officinal acid and No. 8 acid. The former has a specific gravity of 1.048, the latter 1.040 and is 20 per cent. weaker.

Why is No. 8 Acetic Acid so called? It is called No. 8 acid because it was formerly used in the proportion of 1 to 8, to make dilute acetic acid or distilled vinegar.

What is glucose? Glucose is grape sugar prepared by the action of dilute Sulphuric Acid upon Starch.

What is its principal use in Pharmacy? As an excipient for making pills.

Name a volatile oil obtained from the animal kingdom. Oil of Ambergris.

What effect has water on Black Mustard? In connection with the Myrosin contained in the Mustard it converts the Myronate of Potassium (also present) into a volatile oil.

What are Carbohydrates? Substances composed of carbon, hydrogen and oxygen, the two latter being in the proportion to form water.

What is Salt of Lemon? Oxalate of Potassium.

Describe Oleic Acid. An oily liquid, having a slight smell and pungent taste, soluble in alcohol and ether, lighter than water, in which it is insoluble, and crystallizable in needles at a temperature a little below zero C. (32° F).

What is Red Oil? Red Oil is crude Oleic Acid.

What is Turlington's Balsam? Tinctura Benzoini Composita.

What is an element? A substance which cannot by any known means be resolved into any simpler form of matter.

What is a Molecule? The smallest particle of matter that can exist in a free state.

What is an Atom? A particle of matter so small that it undergoes no further subdivision in chemical transformations.

What salts are formed by the action of Iodine on Potash? Iodide and Iodate of Potassium.

How would you separate the two? By dissolving out the Iodide with spirit of wine, which leaves the Iodate.

How is Iodate detected in Iodide of Potassium? To a solution of the sample add Tartaric Acid and then Mucilage of Starch; a blue color indicates the presence of Iodate.

What is the difference between Carbonate and Bicarbonate of Soda? The Bicarbonate is formed by replacing one atom of the sodium in the carbonate by hydrogen.

What is Proof Spirit? Dilute Alcohol.

What is Spirit of Wine? Alcohol.

What effect has heat upon Gallic Acid Heated to 210° C., it forms pyrogallic acid and carbon dioxide.

What is a simple test for iron in solution? Tannin.

Name an officinal Pill containing an abstract. Pilulæ Catharticæ Compositæ.

How would you prepare Dilute Hydrocyanic Acid extemporaneously? By the action of Hydrochloric Acid and water on Cyanide of Silver.

How would you distinguish Tannic from Gallic Acid? Sulphuric Acid produces a black color with Tannic and a red color with Gallic Acid.

What is a Bulb? It is a corm which is covered with short leaves or scales.

What is a Pepo? It is a sort of berry which belongs to the Gourd family. Example—pumpkin, cucumber.

What is a Pome? A berry belonging to the apple family.

What is a Seed? It is that part of the plant that contains the embryo. It generally consists of coats and a kernel.

What do plants absorb from the air? Carbonic Acid gas.

What do plants give off into the air? Oxygen.

What is meant by the Nascent state of an element? It is the extraordinary combining power which it possesses on being liberated from a compound.

Thus, colored cloth, when wet and exposed to Chlorine gas, looses its color by the Chlorine combining with the hydrogen of the water and liberating the oxygen, which in turn unites with the coloring matter of the cloth and forms colorless compounds. Oxygen possesses this power only when being liberated from a compound; hence this state is called the Nascent state of Oxygen.

How is Potassium Chlorate prepared? By passing an excess of Chlorine into a warm concentrated solution of Caustic Potash.

How would you convert Litres into Quarts? Add six per cent.

How is Sulphureted Hydrogen prepared? By the action of dilute Sulphuric Acid upon Iron Sulphide.

What is the best test for Arsenic? By the evolution of Arseniureted Hydrogen, on adding zinc and Sulphuric Acid to the solution to be tested. On burning the gas, Arsenic is deposited in the metallic state upon a piece of cold porcelain held in the flame.

What are Acrid principles? Extractive substances, frequently amorphous, of various composition; they are usually neutral principles, sometimes resinous, whose names end in *in*; some however, have acid character.

What officinal liquor is made without water? Liquor Gutta-Perchæ.

What is the difference between liquor ferri subsulphatis and liquor ferri tersulphatis? The latter contains a larger proportion of Sulphuric Acid.

What effect has heat upon Gallic acid? When heated at 210° C., it forms pyrogallic acid and carbon dioxide.

Aurum. What is the Officinal Salt? Auri et Sodii Choridum.

Give the officinal Salts of Silver.

Argenti Cyanidum,
Argenti Iodidum,
Argenti Nitras,
Argenti Nitras Dilutus,
Argenti Nitras Fusas,
Argenti Oxidum.

Distinguish between a Chemical Element and a Compound. A Chemical Element is one out of which nothing essentially different from the original substance has been obtained. Compound Elements are made up of two or more elementary substances chemically combined.

Give the botanical name of the clove tree. Eugenia caryophyllata.

What part of the clove tree is officinal? The unexpanded flowers.

What is meant by the latent heat of water? That heat which water absorbs or discharges on passing from the liquid to the gaseous, or liquid to solid state, without effecting its own temperature. Thus, the temperature of boiling water never rises above 212° F., because the steam absorbs the excess of heat which is necessary for its gaseous state.

How is Apomorphine prepared? By heating morphine under pressure with Hydrochloric Acid.

How is Codeine obtained? From the mother liquor after the morphine has been crystallized out.

What is understood by water of crystallization? It is that water, in combination with certain salts, which is necessary for its crystallization.

What preparation of Arsenic is contained in Fowler's Solution? Potassium Arsenite.

What are Herbaceous plants? Those which die down to the ground every year, or after blossoming.

What is an Aborescent plant? One which is tree-like in appearance.

What is a Tuber? A thickened portion of a root-stock.

What is a corm? A very short and thick root stock.

Why is lime used as an antidote for poisoning by Oxalic Acid? It forms an insoluble Oxalate of Calcium.

What is produced if Hydrogen is burned in Oxygen? Hydrogen Mon-oxide, or water.

What is a Pome? A pome is a fleshy fruit like a berry, but the principal thickness is calyx, only the papery pods arranged like a star in the core really belongs to the pistil itself.

How does the arom. sulph. acid of 1870 differ from that of 1880? The percolation of Ginger and Cinnamon is replaced by the use of Oil of Cinnamon and Tincture of Ginger.

What is meant by Colation? Straining.

From what is the word derived? From *Colare*, to strain.

From what is Lanoline prepared? The oily excretion obtained from the wool of the sheep.

What poisons would cause dilation, and what contraction, of the pulpil of the eye? Dilation, Belladonna, Stramonium; Contraction, Opium, Calabar Bean.

From what are Antipyrin and Antifebrin prepared? They are both prepared from Phenol Compounds.

What is the difference between washed Sulphur, Precipitated Sulphur, and Sublimed Sulphur?

Washed Sulphur is Sublimed Sulphur with the impurities removed by washing it with water and Water of Ammonia.

Precipitated Sulphur is Sublimed Sulphur made into solution by boiling with water and lime, then precipitated with Hydrochloric Acid.

Lac Sulphur is an inferior article, precipitated by Sulphuric Acid and contains Calcium sulphate. It is sometimes called Milk of Sulphur.

Sublimed Sulphur is the condensed vapors of Sulphur, also known as Flowers of Sulphur.

Name some of the most important officinal products from animal sources. Cantharis, Adeps, Oleum Morrhuæ, Pepsinum.

Name two true gums, Acacia and Tragacantha.

How is Acetic Ether made? By decomposing acetate of sodium by means of sulphuric acid in the presence of alcohol.

What is meant by the terms oxidation and reduction as applied to chemistry? Oxidation is the action of oxidizing a body, that is, combining it with oxygen, a combination from which results an oxide. Reduction is the process of restoring Oxides, Chlorides, Sulphurets, etc., to the metallic state.

Name some vegetable acids used in Medicine. Acidum Acetitum, Acidum Lacticum, Acidum Citricum, Acidum Tannicum,

Name the officinal salts of Cuprum. Cupri Acetas, Cupri Sulphas.

When Syrup of Squills is added to a solution of Carbonate of Ammonia, effervescence is produced. Explain what chemical change takes place. The Carbonate of Ammonia is converted into an Acetate.

How would you convert the Sulphate of Quinine into the Alkaloid Quinine? Dissolve in dilute Sulphuric Acid and precipitate with ammonia.

What part of the plant is Anisum? The fruit.

Name some Mineral Acids used in medicine. Acidum Nitricum, Acidum Sulpuhricum, Acidum Arseniosum, Acidum Boricum.

What is meant by Narcotic Medicines? Those which have the property of stupefying.

Name some of the most important, Opium, Belladonna, Aconite, Hyoscyamus.

What per cent. of absolute Glycerin should Glycerinum contain? 95 per cent.

What per cent. of Strychnine in Ferri et Strychninæ Citras? One per cent.

What is Pyroligneous Acid? Crude Acetic Acid.

What is Whiting? A form of prepared or elutriated chalk.

How is Ferri Phosphas prepared? By the double decomposition between Citrate of Iron and Sodium Phosphate.

What per cent. of water of crystallization does Ferri Sulphas contain? 38.85 per cent.

What is a Chemical Symbol? A capital or a capital and one small letter, used as a short-hand method of expressing an elementary substance.

What is a Diuretic? A medicine which acts on the kidneys and produces an increased flow of urine.

What is an Emmenagogue? A medicine which excites the menstrual secretion.

What is a Diaphoretic? A medicine which increases the cutaneous discharge.

What is a Cholagogue? A medicine which increases the flow of bile.

What is an Emollient? A substance which serves as a vehicle for the application of warmth and moisture.

What is an Astringent? A substance which causes contraction of the tissues.

What are tonics? Medicines which stimulate the nutritive processes.

What is an emetic? A medicine which acts on the stomach, producing vomiting.

What is an Alterative? A medicine employed to modify the nutritive process of the body when in a diseased condition.

What is a Demulcent? A substance which lubricates the surface to which applied and prevents the contact of irritating substances.

What is an Anæsthetic? Gaseous vapors employed to produce surgical anæsthesia.

How would you test urine for Albumen? By acidulating with nitric acid and boiling, which will coagulate the albumen.

Why is the Acid used? To keep the phosphates in solution.

What are Organic Compounds? Compounds containing carbon, whether of animal or vegetable origin. Practically all carbon compounds are organic compounds, and all so-called organic compounds are carbon compounds.

How would you detect Sugar in the urine? By boiling a few drops of the urine in a solution of sulphate of copper and liquor potassa a yellowish red precipitate will denote the presence of Sugar.

How would you detect Bile in urine? By dropping nitric acid upon a small quantity of the urine placed on a glass or plate, when a peculiar play of colors will appear, green yellow and violet.

What is the ordinary normal specific gravity of healthy urine? Between 1.015 and 1.025.

About what quantity is usually passed in 24 hours? From 40 to 45 ounces.

What should be its reaction? Slightly acid.

How may recovered alcohol be purified? By distillation.

Is Glycerin heavier or lighter than water? Heavier.

What are Local Remedies? Medicines applied externally.

Name two or three. Tr. Iodine, Tr. Arnica and Ceratum.

What poison causes dilation of the pupil of the eye? Belladonna.

Name one that causes contraction of the pupil of the eye. Opium.

What is the English officinal name of this chemical compound—$Mg\ SO_4\ 7\ H_2\ O$? Sulphate of Magnesium.

What is the Latin officinal name of this compound —$Na_2\ B_4\ O_7\ 10\ H_2\ O$? Sodii Boras.

Name the officinal Soaps? Sapo and Sapo Viridis.

What variety of sugar is found in urine? Grape Sugar.

From what salt of Bismuth is the officinal Citrate prepared. Subnitrate of Bismuth.

$C_2\ H_5\ HO$—From what and how is this compound obtained? Alcohol is a liquid generated in vegetable juices and infusions by a fermentation, called the vinous or alcoholic, and then distilled off.

$Na\ H\ CO_3$—Give the officinal Latin name. Sodii Bicarbonas.

What is the commercial source of Ammonia? Gas liquor, of coal gas works and Bone-spirit, which is a secondary product in the manufacturing of Bone-black.

What is the composition of Argenti Nitras Dilutus U. S. P.? Equal parts of Nitrate of Silver and Nitrate of Potassium melted together.

How would you distinguish Carbolic Acid from Creasote? Creasote does not coagulate Albumen or Collodion; Carbolic Acid does.

How is Bichromate prepared from the Chromate of Potassium? By acidulating its solution with Sulphuric Acid.

Distinguish between a Precipitate and a Sediment, giving an example of each. A Precipitate is solid matter thrown out of solution by chemical action, while a Sediment is the settling to the bottom of solid matter suspended in a liquid.

What are Narcotics? Medicines which have a sedative influence, frequently promote sleep, relieve pain and produce insensibility.

What lead salts are used in making Goulard's Extract? Acetate of Lead and Oxide of Lead.

What are the chief constituents of air? Oxygen 23, Nitrogen 77, by weight.

Define the terms Deodorizer, Disinfectant and Antiseptic.

Deodorizers are substances which decompose offensive effluvia.

Disinfectants are substances which decompose putrid and infectious matter.

Antiseptics are substances which prevent putrefaction.

What is an Acidulous Radical? A group of elementary substances which unite with Hydrogen to form acids and with bases to form salts.

Why are some salts acid in reaction while others are alkaline? Those which are acid, are combinations of a strong acid and a weak base. Those alkaline in reaction are combinations of a strong alkali with a weak acid.

What is an acid? An acid is a substance formed by the union of Hydrogen with an acidulous radical, and forms salts by having its Hydrogen replaced by a base.

What is a base? A base is a substance which replaces the Hydrogen of an acid and forms a salt.

What remains when ignited Phosphorus has removed all the Oxygen from a confined portion of air? Nitrogen.

What is the chemical formula of Ammonium? NH_4.

What is the source of the Ammonium Salts? The ammoniacal liquor of gas works.

What are Anthelmintics? Medicines which destroy worms, or expel them from the bowels.

How much phosphorus does Oleum Phosphoratum contain? One per cent.

What is meant by Posology? That branch of medicine that treats of doses.

What is the cause of the precipitation which sometimes occurs in making aromatic spirit of ammonia? This is due to the use of effloresced ammonium carbonate, which contains more than the proper quantity of bicarbonate.

What percentage by weight is contained in aqua ammoniæ, U. S. P.? Ten per cent.

What is the object in keeping lime water upon undissolved lime? To insure a saturated solution.

What are the characteristics of alkaline earths?

They are bivalent, form basic hydrates, and insoluble carbonates, phosphates and arseniates.

What per cent. of water of crystallization does alumen contain? 45.57 per cent.

What is meant by Volume? The space occupied by a certain amount of matter.

Is Ferri Sulphas a Ferrous or Ferric Salt.
Ferrous.

Is Ferri Phosphas a Ferrous or Ferric Salt?
Ferric.

To what class of oils does Cacoa Butter belong?
Fixed Oils.

From what is Oleum Morrhuæ obtained? From the fresh livers of Gadus Morrhua.

Name the officinal preparations of Phosphorous? Acidum Phosphoricum, Oleum Phosphoricum, Pilulæ Phosphori.

What Emplastrum is made from an Oleoresin? Emplastrum Capsici.

What Officinal Liniment is made from a Fluid Extract? Linimentum Belladonnæ.

What form of Mercury is used in preparing Oleatum Hydrargyri? The Yellow Oxide.

In what officinal preparation is Lard Oil used? Unguentum Hydrargyri Nitratis.

At what temperature does Acidium Aceticum Glaciale become a solid? 50° F.

What Acid is contained in Oil of Bitter Almonds? Hydrocyanic Acid.

How is Acetic Acid obtained from Acetate of Sodium? It is distilled from a solution of acetate of sodium and sulphuric acid.

What poisonous impurity is often found in crude Antimony? Arsenic.

What is a prominent physical property of Mn salts? Pinkish in color.

In what preparations are the manganese compounds used? MnO_2, used in making chlorine water, and in permanganate of potassium.

What are waxes? They are fats having a high fusing point. Wax, however, is a term more properly applied to the compounds of the fatty acids with radicals, such as *cetyl*, $C_{16}H_{33}$ (in spermaceti—cetaceum), ceryl, $C_{27}H_{55}$ (in Chinese wax) and myricil, $C_{30}H_{61}$ (in beeswax).

What is meant by anhydrous? A body that is entirely free from water in combination.

What is produced when Hydrogen is burned in the air? Water.

To what class of vegetable principles does Gamboge belong? Gum resins.

How is Ferrum Reductum made? By passing hydrogen through a tube containing subcarbonate of iron kept at a red heat.

What is Moschus? The dried secretion from the preputial follicles of Moschus moschiferus.

Name a good excipient for making Permanganate of Potash into pills. Kaolin ointment, or resin cerate.

How would you detect Starch as an adulterant in Gamboge? Boiled with water, gamboge which is so adulterated yields a liquid which becomes green when test solution of Iodine is added.

Give the formula for Carbonic Acid Gas. CO_2.

What effect have large quantities of the above upon animal life? Destroys it.

Where does the natural supply come from? It is exhaled from the lungs of animals.

What is formed when this gas is dissolved in water? Carbonic Acid.

Give its formula. $H_2\ CO_3$.

Give the formula for Carbonic Oxide. CO.

What is Iodine? One of the elementary substances.

What is formed when solution of Nitrate of Silver is added to solution of common Salt? Chloride of Silver and Nitrate of Soda are formed.

What is Kaolin? Disintegrated Felspar.

What is Felspar? A double silicate of Aluminum and other metals.

What would you do were a patient brought to you suffering from the effect of some unknown poison? Administer a prompt emetic and send for a physician.

What class of drugs require fine comminution for percolation? Woody materials.

What class should be in coarse powder? Fleshy and easily permeable substances.

What is the chemical difference between Sodii Chloras and Sodii Chloridum? The Sodii Chloras contains three atoms of oxygen.

With what is Lard Oil usually adulterated? Paraffin Oil.

From what is Suet obtained? From the abdomen of Ovis Aries.

Name the officinal glucosides.

Chrysarobinum, Elaterinum, Glycyrrhizinum (ammoniated), Picrotoxinum, Salicinum, Santoninum.

Why is Atropia used as an antidote in opium poisoning? For its stimulant action on the respiratory centers.

Name several varieties of the metal Iron? Wrought and Cast Iron and Steel.

To which of these varieties does the officinal Ferrum belong? Wrought Iron.

Give tests for boric acid. Alcohol flame turns green with it. Tumeric paper, brown.

Name a typical perfect, natural emulsion. Milk.

What decomposition takes place when Chlorate of Potash is heated? Oxygen is given off.

Name the Acids of Sulphur. Sulphurous and Sulphuric Acids.

What is the chemical composition of water? H_2O.

What is the source of Phosporous? Bones.

What is meant by Isomerism? That condition of different bodies which agree in composition, but differ in properties.

What is meant by Isomorphous? That condition of different bodies which have the same crystalline form.

From what country are the officinal varieties of Cinchona principally obtained? South America.

What is the general composition of Essential Oils? They are usually mixtures of the liquid hydrocarbons or elæoptens with oxidized hydrocarbons, which are commonly solid bodies termed stearoptens.

Name the officinal preparations of starch. Amylum Iodatum and Glyceritum Amyli.

What is the composition and properties of Cyanogen? Cyanogen (CN) as met with in compounds is a univalent radical, and behaves chemically like the halogens. The gas $(CN)_2$ is very irritating to the eyes and air passages, and possesses a penetrating odor like bitter almonds.

What compound is formed with Cy and H? Hydrocyanic, or Prussic Acid, HCN or HCy.

What is a stearopten? Volatile oils are usually mixtures of the liquid hydrocarbons, or *elæoptens*, with oxidized hydrocarbons, which are commonly solid or camphor-like bodies, termed *stearoptens*.

What is Cryolite? A double floride of Aluminum and Sodium.

What is the best supporter of combustion? Oxygen.

Name two distinct forms of Carbon. Plumbago and Diamond.

What remains when ignited Phosphorus has removed all oxygen from a confined portion of air? Nitrogen.

What do plants absorb from the air? Carbonic Acid Gas.

What do they give off into the air? Oxygen.

What is absolute Alcohol? Alcohol freed from water by treatment with lime, chloride of calcium or other salt having a great affinity for water.

What effect has Mercury upon Gold? Unites with it, forming an amalgam.

How would you separate Gold and Mercury when mixed? By sublimation.

How would you recover the Gold from a mixture of Gold and Silver? Dissolve out the silver with nitric acid, which leaves the gold in the metallic state.

How would you recover Silver in the metallic state from the Nitric Acid solution? By precipitating it with Hydrochloric Acid and reducing the precipitated chloride by heat.

What is an Amalgam? A mixture of metals, one of which is mercury.

From what is the officinal Oil of Juniper prepared? From the fruit of Juniperus Communis.

What is Glyconin? Glyceritum Vitelli.

Miscellaneous Questions Without Answers.

We give below a few questions, the answers to which are omitted for obvious reasons:

What poisons are you in the habit of registering when sold?

What do you dispense when Aqua Menthæ is prescribed?

Name several narcotic medicines.

Name several drugs belonging to each of the following classes: Antiseptic, Anæsthetic, Astringent, Alterative, Cholagogue, Diaphoretic, Diuretic, Demulcent, Emetic, Emollient, Emmenagogue, Tonic.

Give outline of the officinal Assay of Opium.

Name some drugs or preparations which are liable to explode upon mixing.

Give outline of the officinal Assay of Chinchona Bark.

Name some deliquescent salts.

Name some efflorescent salts.

What is the difference between Putrefaction and Fermentation?

Name three solid, three gaseous, and two liquid elements.

Name three solid, three liquid and two gaseous compounds.

How can the alcoholic strengths of whisky, brandy and wine be determined?

Name two articles that make explosive mixtures with chlorate of potassium.

Write out a metric prescription for 20 pills, each containing the equivalent of 1-60 grain of strychnine and 5 grains of sulphate of quinine.

What would be the result of combining in solution sulphate of morphia and bicarbonate of potash?

What sugars are officinal?

Name some of the most important officinal products from animal sources.

What is the Latin officinal title of the following salts: Tartar emetic, alum, verdigris, copperas, rochelle salts, Prussian blue, prussiate potass, blue stone, white vitriol, salts of tartar?

When sulphate of zinc and acetate of lead are triturated together they become moist. Why is this, and how would you mix them to prevent this taking place?

Name any two officinal preparations you have made, and state how you prepared them, naming all the articles used in each.

Write the chemical formula for three compounds of iron used in medicine.

Give a process for making glycerin suppositories.

Name a solvent for Gold; for Platinum.

State what precaution is necessary in mixing Turpentine and Sulphuric Acid.

What is the result when Camphor and Hydrate of Chloral are rubbed together.

Why is it that certain solids produce this result when triturated together?

Name some other solids which produce a like result.

Name some drug that you would not dispense in connection with Antipyrine.

What is meant by therapeutical incompatibility?

What is meant by chemical incompatibility?

What are terpens?

Give the percentage of HCN and the maximum dose of the officinal preparation.

Name several drugs yielding officinal volatile oils.

What percentage of total alkaloids and what percentage of quinine is required by the U. S. P. to be contained in cinchona barks?

Give an outline of the process of percolation.

Give the process you follow to make 100 pills, each containing $\frac{1}{100}$ grain of phosphorus.

What is the general composition of essential oils?

Name the classes into which they may be divided.

Of what two principles do they consist?

What action has nitric acid upon volatile oils?

How is spirits mindererus made? Give the officinal name.

Name a few of the officinal tinctures and mode of preparation.

Oleum Morrhuæ—where and from what abtained? State mode of preparation. Give medicinal properties and dose.

Under the influence of water, what will some oils deposit?

Name a drug that is incompatible with Iodide of Potash.

Give an outline of the process you would go through, were you called upon by the physician to make an analysis of a sample of urine.

What do you understand by the terms acids, bases, and salts.

How would you prepare mercurous and mercuric chloride in case you were out of same and were obliged to have them at once, supposing you had hydrochloric acid and mercury on hand?

Define theoretical pharmacy, and show in what respect it differs from practical pharmacy.

Define metrology, and give number of grains in the unit of weight of one gram as known in the metric system.

Write in full the table for apothecaries' weight, also avoirdupois.

Give approximate measure of a teaspoonful, tablespoonful, dessert-spoonful, wine-glassful and gill.

What is a sacchrometer? and how is the scale graduated?

For what purpose is the lactometer employed?

What do you understand by fusion? Give example.

Define calcination, and give process of preparing lime or magnesia by the above process.

What is understood by evaporation? Give example.

Evaporation—Define and name some product you have produced by the above method.

Oleum Theobromae—Give common name. Describe from what and from where obtained. What is its principal use in pharmacy?

What active principles are obtained from spunk wood, hellebore, golden seal?

Name a few of the preparations of ether, their uses and doses.

What is the composition of Donovan's solution? Give the percentage of each of the active ingredients.

What do you understand by the term solvent?

Name the most universal one. Is carbonate of iron soluble in it?

How do crystals and crusts of chloral hydrate compare in purity with each other?

What is the chemical difference between Carbo Animalis and Carbo Ligni?

What is meant by the combining weight of an Element? Give an example.

What is atomic weight? Explain briefly how the atomic weight of an element may be obtained.

Is it necessary, according to the laws of your State, to keep a poison register?

What kind of ginger should be used in pharmaceutical preparations? And why?

What is galenical pharmacy?

Give common name of the following: Matricaria, amylum, cuprum, sapo, myristica, salvia, santalum, tanacetum marrubrum, sanguinaria, scutellaria, cataria.

When "Solution of Morphine" is prescribed, what strength would you dispense?

How do Ointments, Oleates, and Cerates differ from each other? Give the chief characteristics of each.

From their physical appearance, how would you distinguish between Sul. Morphine and Sul. Quinine? Between Epsom Salts and Oxalic Acid? Between Elaterium and Codeia? Between Chlorate of Potash and Nitrate of Silver Crystals?

Which of the following are simple and which chemical solutions: Donovan's Solution? Liq. Ferri Citratis? Liq. Ferri et Quiniæ Citratis? Liq. Plumbi Subacetatis? Liq. Sodii Arsenitis? Liq. Zinci Chloridi?

There are thirty-four officinal syrups; name six of them. State in each case whether they are made with heat, by simple addition, or by agitation without heat.

How many ounces Imperial measure are there in 400 c. c. ? Convert 400 c. c. into fluid onces (wine measure).

Give the components of Simple Elixir U. S. P and enumerate the officinal Elixirs.

DEFINE THE FOLLOWING:

COMMINUTION—Reducing drugs to fine particles.

DESICCATION—Is depriving solid substances of moisture at a low temperature.

DELIQUESCENCE—Is the absorption of moisture from the air by a salt.

DISTILLATION—Vaporizing and condensing a liquid.

DESTRUCTIVE DISTILLATION—Is that in which the substance is consumed and the products of combustion are condensed and collected.

DIGESTION—Is maceration with the addition of gentle heat.

DECANTATION—The process of separating a fluid from a solid by allowing the solid to deposit at the bottom of the vessel and pouring off the liquid.

DIALYSIS—Is separating crystallizable from uncrystallizable solids by placing a solution containing both in a porous diaphragm, the under surface of which is in contact with water.

EFFLORESCENCE—A loss of moisture by a salt in presence of air.

ELUTRIATION—Is obtaining a fine powder by suspending an insoluble powder in water and decanting the liquid containing the lighter particles.

EMULSION—An aqueous preparation in which oily or resinous substances are suspended by the agency of viscid or gummy substances.

EXSICCATION—Depriving solid substances of moisture at a high temperature.

EFFERVESCENCE—Ebullition from chemical reaction.

FRACTIONAL DISTILLATION—Distillation where a lighter liquid is to be separated from a heavier one.

FILTRATION—Separating liquids from solids by passing the liquids through a filter.

GRANULATION—Obtaining a coarse powder by constantly stirring a liquid containing a solid in solution while the liquid is being evaporated.

ISOMERIC—An epithet applied to different bodies which agree in composition but differ in properties.

ISOMORPHOUS—An epithet applied to different bodies which have the same crystalline form.

LEVIGATION—Is reducing substances to a minute powder by trituration after they have been made into a paste with water.

MACERATION—Soaking the drug in a menstruum to extract its virtues.

PRECIPITATION—Is separating solids from liquids by heat, light or chemical reaction.

PERCOLATION—Passing a menstruum through a powdered drug in a percolator.

SOLUTION—To dissolve in a liquid.

SUBLIMATION—Vaporizing and condensing a solid.

TRITURATION—Rubbing in a mortar.

ABSTRACTA—Abstracts.

Are powdered preparations double the strength of the drug or fluid extract.

Give general formula.

A concentrated fluid extract of the drug is mixed with sugar of milk, evaporated to dryness and powdered.

Name the advantages possessed by this class of preparations.

1.—"Each abstract represents twice the strength of the drug or fluid extract from which it is prepared."

2—"They are dry powders, if properly made, and thus are permanent and portable, not subject to precipitation, as fluid extracts are; not liable to become hard, brittle and variable in strength, as in the case with extracts."

3—"Injurious exposure to heat is entirely avoided, and the officinal process requires no apparatus but such as either is at hand in the pharmacy or can be easily obtained by a pharmacist operating upon the small scale."

4.—"The final thorough trituration of the dry powder reduces the soluble and active constituents of the drug to a pulverulent condition, the diluent is soluble and the fine state of division of abstracts is the most favorable condition that a powder can possess to secure efficient medication."

How many are officinal? Eleven.

Name two officinal ones.

Abstractum Conii,
Abstractum Belladonnæ.

ACETA—Vinegars.

Are solutions of active principles of drugs in dilute Acetic Acid?

What is the per cent. of all vinegars?

Ten per cent.

How many are officinal? Four.

Name them.

Acetum Scillæ,
Acetum, Lobeliæ,
Acetum Opii,
Acetum Sanguinariæ.

What menstruum was formerly used in making vinegars?

Wine and cider vinegar.

Give the ingredients of Acetum Opii.

Powdered Opium	10
Powdered Nutmeg	3
Sugar	20
Dilute Acetie Acid, Q. S.	100

Give the ingredients of Acetum Scillæ.

Squill in No. 30 Powder	10
Diluted Acetic Acid. Q. S.	100

Give the ingredients of Acetum Lobeliæ.

Lobelia in No. 30 Powder	10
Diluted Acetic Acid, Q. S.	100

Give the ingredients of Acetum Sanguinariæ.

Sanguinaria	10
Diluted Acetic Acid, Q. S.	100

AQUÆ—Medicated Waters.

What is an Aqua, or Water? An aqueous solution of a volatile substance.

How many Officinal waters are there? Fourteen.

How many methods used in preparing them? Five.

Name them.

1st.—By simple solution of the drug in water.
2d.—Simple solution in hot water.
3d.—Filtration through an absorbent powder.
4th.—Filtration through cotton saturated with the medicated drug.
5th.—Distillation.

What is distilled water?

A colorless, limpid fluid, without odor or taste, and of a neutral reaction. On evaporating one litre, no fixed residue should remain.

In pharmacy, water is used principally as a solvent.

BALSAMS

Are resinous substances which contain Benzoic, Cinnamic or an analogous acid.

How many officinal ones are there? Two.

Name them.

Balsamum Tolutanum.

Balsomum Peruvianum.

CERATA—Cerates.

Are unctious substances of such consistency that they may be easily spread with a spatula.

How many officinal ones are there? Eight.

What substances are used for bases? Oil, lard, petrolatum. Wax, and sometimes paraffin or spermaceti, in the presence of wax, are used to raise the melting point of the bases.

Name two modes of preparation.

By Fusion.

By Incorporation,

Name two by each process.

By Fusion—Ceratum Cantharidis.

By Fusion—Ceratum Cetacei.

By Incorporation—Ceratum Camphoræ.

By Incorporation—Ceratum Plumbi Subacetatis.

Give formulæ for Ceratum.

White Wax	30 parts.
Lard	70 parts.

Why is Ceratum so named?

From "Cera," meaning wax.

Give the ingredients of Ceratum Plumbi Subacetatis (Goulard's Cerate).

Sol. of Subacetate of Lead	20 parts.
Camphor Cerate	80 parts.

DECOCTA—Decoctions.

Are liquid preparations made by boiling the drug in water.

What per cent. should they be made when not otherwise ordered? Ten per cent.

How many are officinal? Two.

Name them.

Decoctum Cetrariæ.

Decoctum Sarsaparillæ Compositum.

Give the ingredients of Com. Decoction of Sarsaparilla. Sarsaparilla, Sassafras, Guaiacum Wood, Licorice Root, Mezereum, Water.

ELIXIRIA—Elixirs.

Are Aromatic sweetened, spirituous preparations containing small quantities of active medicinal substances.

Elixir of Orange is the only officinal one.

Give the ingredients. Oil of Orange, Sugar, Alcohol and water.

EMPLASTRA—Plasters.

Are substances for external application of such consistency that they adhere to the skin, and require heat in spreading.

On what are plasters usually spread? Plasters are usually spread on muslin, leather, paper, etc., and have, as a basis, lead plaster, a gum resin, or Burgundy pitch.

How many officinal ones? Seventeen.

Name two.

Emplastrum Ferri.

Emplastrum Saponis.

Give the officinal name for strengthening plaster. Emplastrum Ferri.

Give the ingredients of Lead Plaster. Oxide of Lead, Olive Oil, Water Q S.

Give the ingredients of Belladonna Plaster. Belladonna Root, Alcohol, Resin Plaster, each Q. S.

From what part of the plant is Belladonna plaster made? The root.

Give the ingredients of Capsicum Plaster. Resin Plaster, Oleoresin of Capsicum, each Q. S.

Give the officinal name for Court Plaster. Emplastrum Ichthyocollæ.

EXTRACTA FLUIDA—Fluid Extracts.

Are alcoholic solutions of a drug, representing one grain to the minim.

How prepared?

By Maceration.

By Percolation.

Give general process for making a fluid extract. Moisten the powder with the menstruum; pack in a percolator; pour menstruum on it until the fluid begins to drop. Then stop the lower orifice and macerate 48 hours. Then proceed with percolation.

What great advantages do they possess over tinctures? They are uniform, definite and concentrated.

What acid is used in making Fl. Ext. Ergot? Hydrochloric.

Why is glycerin used in Fluid Extracts? To prevent precipitation.

Name one made with pure Alcohol. Fl Ext. Aconite.

Name one made with Water and Alcohol. Fl. Ext. Nux Vomica.

Name one which contains Glycerin. Fl. Ext. Wild Cherry.

Give ingredients of Fluid Extract of Sarsaparilla Compound.

Sarsaparilla,
Glycyrrhiza,
Sassafras Bark,
Mezereum,
Glycerin,
Alcohol and Water.

How many Compound Fluid Extracts are officinal? One

EXTRACTA—Extracts.

Are solids or semi-solids made by evaporating solutions of vegetable principles.

Name two officinal extracts.

Extractum Malti,
Extractum Opii.

What are the ingredient of Extractum Colocynthidis Compositus?

Extract of Colocynth	16 parts
Aloes	50 parts
Cardamom	6 parts
Resin of Scammony	14 parts
Soap	14 parts
Alcohol	10 parts

GLYCERITA—Glycerites.

Are mixtures of medicinal substances with glycerin.

How many are officinal? Two.

Name them.

Glyceritum Amyli, Glyceritum Vitelli.

GUMS.

Gums are vegetable substances which form with water a thick, glutinous liquid—mucilage. They are insoluble in alcohol.

How many are officinal? Two.

Name them.

Acacia and Tragacantha.

Is Gum Tragacantha soluble in water? No.

GUM RESINÆ.

Are natural mixtures of gum and resin obtained as exudations from plants.

Name two.

Myrrh and Asafœtida

INFUSA—Infusions.

Are liquid preparation made by treating the drug with hot or cold water without boiling.

How made?

Maceration,
Digestion,
Percolation,
Dilution.

Why is cold water used in making infusion of Prunus Virginianæ?

To prevent loss of the Hydrocyanic Acid.

What strength should infusions be made where not designated? Ten per cent.

How many are officinal? Five.

Give the ingredients of Infusion Digitalis.

Digitalis,
Cinnamon,
Alcohol and Water.

Give the ingredients of Infusion of Senna Compound.

Senna	6 parts
Manna	12 parts
Sulphate of Magnesia	12 parts
Fennel	2 parts
Water, Q. S.	100 parts

Give the ingredients of Infusion Cinchona.

Cinchona	6 parts
Aromatic Sulphuric Acid	1 part
Water	100 parts

LINIMENTA—Liniments.

Are oily and alcoholic solutions of medicinal substances for external application.

What is the base of most officinal liniments?
Cotton Seed Oil.

Name two officinal liniments, and give formulæ.

Linimentum Chloroform:
Commercial Chloroform,.
Soap Liniment.

Linimentum Ammoniæ:
Water of Ammonia,
Cotton Seed Oil.

Give the ingredients of Linimentum Calcis.
Equal parts of Lime Water and Cotton Seed Oil.

How many liniments are officinal? Ten.

Give the ingredients of Linimentum Plumbi Subacetatis.

Solution of Subacetate of Lead	40 parts
Cotton Seed Oil	60 parts

Give the ingredients of Linimentum Terebinthinæ.

Resin Cerate	65 parts
Oil of Turpentine	35 parts

Give the ingredients of Linimentum Belladonnæ.

Fl. Ext. of Belladonna	95 parts
Camphor	5 parts

LIQUORES—Solutions.

Are aqueous solutions of non-volatile substances, except such as form separate and distinctive classes.

How made?

Simple solution in water.
Chemical solution in water.
Solution in Chloroform.

Give example of each.

Liquor Sodæ,
Liquor Ferri Chloridi,
Liquor Guttæ Perchæ.

Give the ingredients of Liquor Plumbi Subacetatis.

Acetate of Lead	170 parts
Oxide of Lead	120 parts
Distilled water, Q.S	1000 parts

Give the ingredients of Liquor Ferri Chloridi.

Iron (in fine wine)	15 parts
Hydrochloric Acid	86 parts

Nitric Acid, Distilled water, each Q, S.

LIQUORS OF THE U. S. P.

THEIR COMPOSITION.

LIQUOR ACIDI ARSENIOSI—One per cent. Oxide of Arsenic, 2 per cent. Hydrochloric Acid.

LIQUOR ARSENII ET HYDRARGYRI IODIDI—One per cent. Iodide of Arsenic, 1 per cent. of Biniodide of Mercury.

LIQUOR CALCIS—Saturated Solution of Hydrate of Calcium.

LIQUOR IODI COMPOSITUS—Five per cent. Iodine, 10 per cent. Iodide of Potassa.

LIQUOR PEPSINI—Four per cent. Sacch. Pepsin, 1.2 per cent. Hydrochloric Acid, 40 per cent. of Glycerin and water.

LIQUOR PLUMBI SUBACETATIS DILUTUS—Three per cent. Sol. Subacet. Lead.

LIQUOR SODII ARSENIATIS—One per cent. Sodium Arseniate.

LIQUOR FERRI CHLORIDI—Iron, Nitric Acid, water and Hyrdochloric Acid. (Contains 37.8 per cent. Ferric Chloride.)

LIQUOR PLUMBI SUBACETATIS—Acetate of Lead, Oxide of Lead, Water, (Contains 25 per cent. Subacetate of Lead.)

LIQUOR POTASSII ARSENITIS—One per cent. Arsenious Acid, 1 per cent. Potassa Bicarb., 3 per cent. Comp. Tr. Lavender, Water.

LIQUOR SODÆ — Sodium Carbonate, Lime, Water.

(Contains about 5 per cent. Sodium Hydrate).

LIQUOR SODÆ CHLORATÆ—Sodium Carbonate, Chlorinated Lime, Water. (Contains as least 2 per cent. free Chlorine.)

LIQUOR ZINCI CHLORIDI—Zinc, Nitric Acid, Precipitated Carbonate of Zinc, Hydrochloric Acid, Water. (Contains about 50 per cent. Chloride of Zinc.)

LIQUOR POTASSÆ—An aqueous solution of Hydrate of Potassium, (Contains about 5 per cent. of the hydrate).

LIQUOR FERRI ET QUININÆ CITRATIS—Thirty-two and one half per cent. of Citrate of Iron and Ammonium, 6 per cent. Quinine, 14 per cent. Citric Acid, 15 per cent. Alcohol and Water.

LIQUOR SODII ARSENIATIS—One per cent. exsiccated Sodium Arseniate.

LIQUOR SODII SILICATIS—Nearly saturated Solution.

LIQUOR MAGNESII CITRATIS—Carbonate of Magnesium, Citric Acid, Potassium Bicarbonate, Syrup of Citric Acid and water.

LIQUOR AMMONII ACETATIS.—Dil. Acetic Acid and Ammonium Carbonate.

LIQUOR FERRI ACETATIS—Contains 33 per cent. Ferric Acetate, and water.

LIQUOR FERRI CITRATIS—Ferric Hydrate with Citric Acid, (44 per cent. of Scaled Salt).

LIQUOR FERRI NITRATIS—Ferric Hydrate, Nitric Acid and water. Contains 6 per cent. of Ferric Nitrate.

LIQUOR FERRI TERSULPHATIS—Ferrous Sulphate, Nitric Acid, Sulphuric Acid and water. Contains 28.7 per cent. of the salt.

LIQUOR FERRI SUBSULPHATIS—Same ingredients as the above. Contains 43.7 per cent. of the salt.

LIQUOR HYDRARGYRI NITRATIS—Red Oxide of Mercury 40 per cent., Nitric Acid 45 per cent., and water. Contains about 50 per cent. of Mercuric Nitrate.

LIQUOR POTASSII CITRATIS—Bi-carbonate of Potassium, Citric Acid and water. Contains about 9 per cent. of Potassium Citrate.

MELLITA—Honeys.

Are thick liquid preparations closely allied to syrups, differing merely in the use of honey as a base, instead of syrup.

There are three officinal honeys:

1. Mel—Commercial Honey. A saccharine secretion deposited in the honey-comb by Apis Mellifica.
2. Mel Despumatum—Clarified Honey. Commercial honey clarified by heating and straining.
3. Mel Rosæ.

Give the ingredients of Mel Rosæ.

Red Rose (No. 40 Powder), Clarified Honey, Diluted Alcohol, Q. S.

MISTURÆ—Mixtures.

Are mechanical mixtures of insoluble substances in aqueous liquid preparations.

How many are officinal? Eleven.

Name three.

Mistura Cretæ,
Mistura Ferri Compositus,
Mistura Glycyrrhizæ.

Give the ingredients of Mistura Potassii Citratis (Neutral Mixture).

Fresh Lemon Juice.............	100 parts
Potassium Bicarbonate, Q. S.	

Give the ingredients of Mistura Cretæ.

Compound Chalk Powder	20 parts
Cinnamon Water	40 parts
Water	40 parts

Give the ingredients of Mistura Glycyrrhizæ Composita.

Pure Extract of Glycyrrhiza	3 parts
Sugar	3 parts
Acacia	3 parts
Camphorated Tincture of Opium	12 parts
Wine of Antimony	6 parts
Spirits of Nitrous Ether	3 parts
Water	70 parts

MUCILAGINES—Mucilages.

Are aqueous solutions of gums or substances closely allied to them.

Name the most important one.

Mucilago Acaciæ.

How many are officinal? Five.

Give ingredients of mucilago Tragacanthæ.

Tragacanth, Glycerin, Water, Q. S.

OLEATA—Oleates.

Are solutions of alkaloids or metallic salts in Oleic Acid.

How many are officinal? Two.

Name them.

Oleate of Mercury.

Oleate of Veratrine.

What is the strength of Oleatum Hydrargyri? Ten per cent.

What is the strength of Oleatum Veratrinæ? Two per cent.

OLEORESINÆ—Oleoresins.

Are liquid preparations consisting principally of natural oils and resins, extracted from vegetable substances by percolation with stronger ether.

How do Oleoresins differ from fluid extracts?

They bear no uniform relation to the drug, and the menstruum used dissolves principles insoluble in alcohol. They are the most concentrated liquid preparations of drugs.

Give general formula for their preparation.

Percolate the powdered drug in a cylindrical percolator provided with a cover and a receptacle suitable for volatile liquids, with stronger ether, until exhausted, recovering the greater part of the ether by distillation; and exposing the residue, in a capsule, to spontaneous evaporation until the remaining ether has evoperated.

How many are officinal? Six.

PILULÆ---Pills.

What are Pilulæ, or Pills?

Pills are small, solid bodies, of a globular, ovoid, or lenticular shape, which are intended to be swallowed, and thereby produce medical action.

Of what is a pill mass composed? and what is required of it?

It is composed of ingredients and excipients. It is required that the mass be, 1, *adhesive;* 2, *firm;* 3, *plastic.*

Give formula for Pil. Cathartic Comp.

Ext. Colocynth Comp	130
Abstract of Jalap	100
Calomel	100

Gamboge.............................. 25

To make 100 pills.

What is the strength of Pil. Opii? 1 grain,

What is the strength of Pil. Phosphorus? ,01 grain.

RESINÆ---Resins.

Are the solid resinous principles of drugs precipitated from their alcoholic solutions by water.

How many officinal? Four.

Name them.

Resina Jalapæ,	Resina Copaibæ.
Resina Podophylli,	Resina Scammonii.

RESINS.

Are solid or semi-solid exudations from plants, insoluble in water, mostly soluble in Alcohol. They are usually the oxidized turpens of plants. Some of them unite with alkalies to form soaps as common resin.

Name two.

Common Resin (Colophony).
Resin of Copaiba.

Describe them.

When pure they are usually transparent, hard and brittle; when they contain water, are opaque, and no longer hard and brittle.

SPIRITUS—Spirits.

Are Alcoholic solutions of volatile substances.

How many methods used in preparing them? Five.

Name them.

No. 1—Simple Solution.
No. 2—Solution and Maceration.
No. 3—Gaseous Solution.
No. 4—Chemical Reaction.
No. 5—Distillation.

Name one by each in above order.

No. 1—Spiritus Myrciæ.
No. 2—Spiritus Menthæ Piperitæ.
No. 3—Spiritus Ammoniæ.
No. 4—Spiritus Ætheris Nitrosi.
No. 5—Spiritus Frumenti.

What change was made in Spirits of Camphor in the U. S. P. of 1880?

Water was added to the formula.

Give the ingredients of Spiritus Camphoræ.

Camphor	10 parts
Alcohol	70 parts
Water	20 parts

Give the ingredients of Spiritus Lavandulæ.

Oil of Lavender Flowers	3 parts
Alcohol	97 parts

Give the ingredients of Spiritus Chloroformi.

Purified Chloroform	10 parts
Alcohol	90 parts

Give the ingredients of Spiritus Ammoniæ Aromaticus.

Carbonate of Ammonia	40 parts
Water of Ammonia	100 parts
Oil of Lemon	12 parts
Oil of Lavender Flowers	1 part
Oil of Pimenta	1 part
Alcohol	700 parts
Distilled Water, Q.S	1,000 parts

SYRUPA—Syrups.

Are concentrated solutions of sugar in water.

There are three kinds of syrups.

1. Syrup, or Simple Syrup—Sugar and Water.
2. Medicated Syrups—Syrups containing various medicinal substances.
3. Flavored Syrup—Syrup used as a flavor only.

How many methods of preparation? Four.

Name them.

No. 1—By solution with heat.
No. 2—By agitation without heat.
No. 3—Addition of medicated liquid to syrup.
No. 4—By digestion or maceration.

Give formula for making Simple Syrup.

Sugar	65 parts
Water, Q. S.	100 parts

Give ingredients of Syrupus Rhei Aromaticus.

Aromatic Tincture of Rhubarb	10 parts
Syrup	90 parts

Give the ingredients of Syrupus Ferri Iodidi.

Iron (fine wire)	25 parts
Iodine	82 parts
Sugar	600 parts
Distilled Water, Q. S.	1,000 parts

SUPPOSITORIA—Suppositories.

What are suppositories? Suppositories are solid bodies intended to be introduced into the rectum, urethra, or vagina, to produce medicinal action.

What are the requirements in preparing them?

They should be prepared of materials of sufficient consistency to retain their shape when inserted, and at the same time, melt at the temperature of the body. Butter of cacao fulfills the requirements.

Only in the hottest summer weather should its melting point be raised by the addition of spermaceti or wax, unless some softening ingredient is used in making the suppositories.

By what three methods are Suppositories shaped? By *rolling*, *moulding* and *pressing*.

What precaution is necessary in making Ergotin Suppositories? To use the least amount of heat possible.

TINCTURÆ—Tinctures.

Are Alcoholic solutions of non-volatile medicines except tincture of Iodine.

Name modes of preparation.

No. 1—Percolation.
No. 2—Maceration.
No. 3—Solution.
No. 4—Dilution.

Give example by each process.

No. 1—Tincture Cantharides.
No. 2—Tincture Aloes.
No. 3—Tincture Iodine.
No. 4—Tincture Chloride of Iron.

How many officinal Tinctures are there? Seventy-three.

Into what two general classes may Tinctures be divided? Into simple and compound Tinctures.

Why is Glycerin used in Tinctures? To prevent precipitation on standing.

How would you prepare the U. S. P. Tincture Herbarum Recentium?

These Tinctures, when not otherwise directed, are to be prepared by the following formula:

Take of the Fresh Herb, bruised or crushed,

50 parts, or by weight	16 oz
Alcohol, 100 parts, or by measure	2½ pints

Macerate the herb with Alcohol for fourteen days, then express the liquid, and filter. (50 per cent. of fresh herb).

How does a Tincture differ from a Spirit? The latter are solutions of *volatile* substances in alcohol, while the former, with one exception, are of non-volatile substances.

What menstrua are used in preparing them? Alcohol, diluted alcohol of various strengths, aromatic spirits of ammonia, or mixtures of alcohol, water and glycerin.

What great advantage does percolation have over maceration in respect to the character of the liquid left in the residue? Maceration leaves a finished tincture in the residue; in percolation, it is merely menstruum, the active portions of the drug having been dissolved in the preceding percolate.

Give the ingredients of Tinctura Opii Deodorata

Powdered Opium	10 parts
Ether	20 parts
Alcohol	20 parts
Water Q. S.	100 parts

Give the ingredients of Tictura Lavandulæ Composita.

Oil of Lavander	8 parts
Oil of Rosemary	2 parts
Cinnamon [powdered]	18 parts
Cloves	4 parts
Nutmeg	10 parts
Red Saunders	8 parts
Alcohol	680 parts
Water	270 parts
Diluted Alcohol, Q. S.	1,000 parts

Give the ingredients of Tinctura Cinchonæ Composita.

Red Cinchona	10 parts
Bitter Orange Peel	8 parts
Serpentaria	2 parts
Glycerin	10 parts
Alcohol and Water, Q. S.	100 parts

Give the ingredients of Tinctura Gentianæ Composita.

Gentian	8 parts
Bitter Orange Peel	4 parts
Cardamon	2 parts
Diluted Alcohol, Q. S.	100 parts

TROCHISCI--Troches.

What are Trochisci, or Troches?

Troches, or lozenges, are solid, discoid or cylindrical masses, consisting chiefly of medicinal powders, sugar and mucilage. They are prepared by making the ingredients into a mass, which is rolled into a thin sheet, and cut into proper shape with a lozenge cutter.

There are sixteen officinal lozenges.

Trochisci Acidi Tannici, Ammonii Chloridi, Catechu, Cretæ, Cubebæ, Ferri, Glycyrrhizæ et Opii ($\frac{1}{20}$ gr. ext. opium in each), Ipecacuanhæ, Krameræ, Magnesiæ, Menthæ Piperitæ, Morphinæ et Ipecacuanhæ ($\frac{1}{40}$ gr. Sulp. Morph. in each); Potassii Chloratis, Sodii Bicarbonatis, Sodii Santoninatis (1 gr. Sant. Sod. in each) Zingiberis.

UNGUENTA--Ointments.

Are fatty preparations, softer than cerates, intended to be applied to the skin by inunction.

Give modes of preparation.

Fusion,
Incorporation,
Chemical Reaction.

Give example of each.

Fusion—Unguentum Diachylon.
Incorporation—Unguentum Hydrargyri.
Chemical Reaction — Unguentum Hydrargyri Nitratis.

Give formulæ for Unguentum.

Lard	80 parts
Yellow Wax	20 parts

What is the strength of Yellow and Red Oxide of Mercury ointment?

Forty-eight grains to the ounce.

Give the ingredients of Unguentum Zinci Oxidi.

Oxide of Zinc	20 parts
Benzoinated Lard	80 parts

Give the ingredients of Unguentum Hydrargyri Nitratis.

Mercury	7 parts
Nitric Acid	17 parts
Lard Oil	76 parts

VINA MEDICATA—Medicated Wines.

Are liquid preparations with wine for the menstruum.

Give two officinal ones.

Vinum Antimonii,
Vinum Ipecacuanhæ.

Give the ingredients of Vinum Album Fortius.

White Wine	7 parts
Alcohol	1 part

Give the ingredients of Vinum Antimonii

Tartrate of Antimony and Potassium	4 parts
Boiling Water	60 parts
Strong White Wine, Q. S.	1,000 parts

Give the ingredients of Vinum Aromaticum

Lavender	1 part
Origanum	1 part
Peppermint	1 part
Rosemarry	1 part
Sage	1 part
Wormwood	1 part
Stronger White Wine, Q. S.	100 parts

INCOMPATIBILITY.

Incompatibility is divided into three classes, viz: Therapeutical, Chemical and Pharmaceutical

Substances are said to be therapeutically incompatible when their action on the human system are mutually antagonistic. With this class however the pharmacist has very little to do.

Chemical incompatibility is where the substances brought into contact react on each other in such a way as to form one or more entirely different compounds. Many prescriptions, however, which are therapeutically correct would come under this head; for example, lime water and calomel or sulphate of zinc and acetate of lead. These are prescriptions in which the chemical reaction between the ingredients is understood and intended. but what the pharmacist must guard against are those chemical reactions between the ingredients of prescriptions which form new and poisonous compounds, and have been overlooked by the physician.

Pharmaceutical incompatibility is where two or more substances when mixed react on each in such a way as to throw each other out of solution, causing precipitates or a disagreeable looking or tasting mixture.

The incompatibility of drugs is governed in the majority of cases by a few simple rules which we will give below.

1st. In mixing any salt with strong acids, decomposition is very apt to take pace.

2nd. Alkalies should never be mixed with salts of the metals proper. Decomposition takes place, and their bases are precipitated.

3d. Vegetable astringents precipitate albumen, gelatine, vegetable alkalies, and numerous metallic oxides, and with salts of iron produce inky solutions.

4th. Glucosides should not be mixed with free acids.

5th. Double decomposition will not occur between solutions of two salts, unless, by the interchange of the two baselous radicals a substance will be produced which is either insoluble or volatile.

6th. When a solution of a compound is brought in contact with a solution of another compound, and by an interchange of radicals, an insoluble compound will be rendered **possible** that compound **will** be precipitated.

Below we give a list of the volatiles, and soluble and insoluble salts. When these are thoroughly learned one can readily see where double decomposition will occur.

Volatiles.—The volatile substances are H_2O—CO_2—H_2S Hcy—HI—HBr—HCL—HNO_3—NH_3 and HNO_3.

Insoluble Salts.—All Hydrates, Carbonates, Phosphates, Oxides, Sulphides, Arsenates, Arsenites, Borates Tanates and Silicates, except those of Sodium, Potassium and Ammonium, are insoluble.

Soluble Salts.—All the compounds of Sodium, Potassium and Ammonium. All Nitrates, Acetates, Chlorates, Permanganates, Lactates and Hypophosphites are soluble.

All Bromides, Chlorides and Iodides, except those of Mercury, Silver and Lead (the $Hg Cl_2$ is, however, soluble). All Sulphates, except those of Barium, Calcium and Lead.

Incompatibles.—Comp. infusion of cinchona with comp. infusion gentian.

Essential oils with aqueous liquids in quantities exceeding one drop to one fluid ounce.

Fixed oils and copaiba, with aqueous liquids, except with excipients.

Spirit of nitrous ether with strong muscilages.

Infusion, generally, with metallic salts.

Compound infusion of gentian with infusion of wild cherry.

Tinctures made with strong alcohol with those made with weak alcohol.

Tinctures made with strong alcohol, with infusions and aqueous liquids.

Attention is called to the danger of simultaneously prescribing in one and the same mixture potassium iodide and potassium chlorate. When this mixture comes into contact with the acids of the gastric juice, iodine is liberated, which, in its turn, acts upon the potassium chlorate and liberates chlorine therefrom. Sohet also alludes to Melsen, who long ago determined that dogs could be killed by administering a mixture of $\frac{40}{60}$ centigrammes ($\frac{6}{9}$ grains) of both salts. The combination of two salts mentioned can therefore not be regarded as free from danger, inasmuch as a poisonous substance results from the action of one or the other.

Discretion should be used in mixing the following with other chemical substances, as decomposition is likely to occur:

Acidum Hydrocyanicum,
Acidum Nitro Muriaticum,
Liquor Hydrarg. et arsen., Iod.,
Liquor Patassii Arsenitis,
Liquor Calcis,
Liquor Iodinii Compositus,
Liquor Potassæ,
Liquor Morphia Sulphatis.
Tr. Ferri Chloridi,
Tr. Iodine,
Potassii Cyanidum,
Potassii Permanganas,
Potassii Iodidum,
Ferri Citratis,
Zinci Acetas,
Potassii Acetas,

OXIDIZING AGENTS, such as *nitric*, *hydrochloric*, *nitro-hydrochloric*, *picric*, and *chromic acids*, and *potassium bichromate* and *permanganate*, *with readily oxidizable substances, such as carbohydrates, alcohols, ethers, sulphur, phosphorus, sulphides, and organic matter in general*, from explosive compounds.

SUBSTANCE.	INCOMPATIBLE WITH
Acacia..........	Alcoholic and ethereal tinctures; Iron Chloride; Lead salts.
Acids, in general	Alkaline solutions; Metallic Oxides.
Salicylic....	Iron compounds; Potassium Iodide; Lime water.
Tannic.....	Alkalies, Carbonates; Lime water; Chlorine water; Albumen.
Bismuth Subnitrate...	Calomel; Sulphur; Tannin.
Chloral Hydrate....	Alkalies, Carbonates; Ammonium, and Mercury Compounds
Iodine	Ammonia; Alkalies; Carbonates; Chloral; Metallic salts; Starch.

Lead Acetate	Acacia; Acid Hydrochlor; Acid Sulphuric and Sulphates; Ammon Chloride; Carbonates; Lime water; Iodine; Potassium Iodide; Tannin.
Mercury Bichloride ..	Potassium Iodide; Salts; Carbonates; Tannin.
Mild Chloride. (Calomel):	Acids; Acid Salts; Alkalies; Carbonates; Ammon. Chloride; Iodine, Potassium Iodide; Iron Chloride; Iodide; Sulphur.
Potassium Chlorate....	Calomel; Organic Substances; Sulphur.
Iodide	Lead and Mercury Salts; Potassium Chlorate; Silver Nitrate; Chlorine Water.
Permanganate	Ammonia salts; Alcohol, Glycerin; Ethereal oils; Organic substances.
Bromide....	Acids, minerals; Chlorine water; Mercury Compounds.
Silver Nitrate	Acids, Acetic, Hydrochloric, Hydrocyanic, Sulphuric, Tartaric, and their salts; Alkalies; Carbonates, Iodine; Potass. Iodide; Bromide; Sulphur.

Antipyrin and its incompatibilities.

Acid carbolic, strong solutions, a precipitate.
Acid hydrocyanic dilute, yellow coloration.
Acid nitric dilute, faint yellow coloration.

Acid tannic, insoluble white precipitate.

Alum (ammonia), deep yellow coloration, fading and precipitating.

Amyl nitrite (acid), green coloration.

Chloral hydrate, strong solution gave a precipitate, with weak solution no apparent change.

Copper sulphate, green coloration.

Extract (fluid) of cinchona bark, precipitate.

Iron sulphate, brownish yellow coloration, deposit on standing, solution turns red.

Mercury perchloride, white precipitate, soluble in excess of water.

Solution of arsenic and mercury iodides, dense white precipitate.

Solution of iron, perchloride, blood red coloration.

Solution of permanganate of potassium, reduction quickly takes place.

Soda salicylate (solid), becomes liquid.

Spirit nitrous ether (acid), green coloration.

Syrup of iodide of iron, reddish brown coloration.

Calomel, a poisonous compound.

Beta-naphthol, forms a moist mixture.

What is the Best Solvent for:

Iodine	Alcohol
Boric Acid	Glycerin and Hot Water
Tannic Acid	Glycerin
Arsenious Acid	Boiling Water, Hydrochloric Acid
Corrosive Sublimate	Alcohol
Phosphorus	Ether and Fatty Oils
Gums	Water
Gum Resins	Alcohol
Resins	Alcohol
Alkaloids	Dilute Acids

Quinine	Dilute Acids
Tartar Emetic	Boiling Water
Gutta Percha	Chloroform
Camphor	Alcohol
Strychnia	Dilute Acids
Gun Cotton	Acetic Ether
Tolu	Alcohol
Benzoin	Alcohol
Myrrh	Alcohol
Phosphorus	Ether
Sulphur	Bisulphide of Carbon

What is the Active Principle of:

Aloes	Aloin
Aconite	Aconitia
Belladonna	Atropia
Blood Root	Sanguinarin
Coffee	Caffein
Cinchona	Quinia
Culver's Root	Leptandrin
Cimicifuga	Macrotin
Digitalis	Digitalin
Erythroxylon	Cocaine
Ergot	Ergotin
Hellebore	Veratrine
Hyoscyamus	Hyoscyamin
Hydrastis	Hydrastin
Ipecac	Emetia
Ignatia	Strychnia
Nux Vomica	Strychnia
Opium	Morphia
Physostigma	Physostigmin
Podophyllum	Podyphyllin
Salix	Salicin
Santonica	Santoninum

Tea....................................Theine
Veratrum..............................Veratria

What is the Per Cent. of the Following?

Absolute Acid in Acid Hydrochloric..31.9 per cent
Absolute Acid in Acid Hydrocyanic Dilute, 2 per ct
Absolute Acid in Acid Nitric..........69.4 per cent
Absolute Acid in Acid Phosphoric Dilute, 10 per ct
Absolute Acid in Acid Sulphuric.......96 per cent
Absolute Acid in Acid Sulphurous. ....3.5 per cent
Alcohol in Officinal Wines........10 to 12 per cent
Aconite in Tincture Aconite...........40 per cent
Alcohol in Spirits Frumenti:
40 to 50 per cent. by weight
50 to 58 per cent. by volume
Ammonia in Aqua Ammonia...........10 per cent
Ammonia in Aqua Ammonia Fortior...28 per cent
Arsenic in Solution of Chloride of Arsenic, 1 per ct
Arsenious Acid in Fowler's Solution.....1 per cent
Chlorine in Aqua Chlori................0.4 per cent
Ethyl Oxide in Ether...................74 per cent
Ethyl Oxide in Ether Fortior..........94 per cent
Ferrous Iodide in Syrupus Ferri Iodidi.10 per cent
Iodide of Arsenic and Biniodide of Mercury
in Donovan's Solntion.......1 per cent. each
Iodine in Tincture of Iodine.............8 per cent
Lime in Lime Water..................0.15 per cent
Mercury in Blue Mass.................33 per cent
Mercury in Blue Ointment.............50 per cent
Mercury in Mercury with Chalk.......38 per cent
Morphia in Liquor Morphia...........
..........About 0.2 per cent. or 1 gr. to 1 oz
Morphia in Magendie's Solution.........3⅓ per cent
Morphia in Pulvis Opii...........12 to 16 per cent
Morphia in Tully's Powder.....1.6, or 1 in 61 parts

Opium in Acetum Opii	10 per cent
Opium in Dover's Powder	10 per cent
Opium in Tincture Opii	10 per cent
Opium in Tincture Opii Camphorata	⅖ of 1 per cent
Opium in Tincture Opii Deod	10 per cent
Quinine in Ferri et Quininæ Citras	12 per cent
Strychninæ in Ferri et Strychninæ Citras	1 per cent

What amount of C. P. Acid in the following?

Acid Nitric Dilute	1½ to 12½ fl. ounces
Acid Sulphuric Dilute	1 to 16½ fl. ounces
Acid Hydrochloric Dilute	5½ to 14 fl. ounces
Acid Acetic Dilute	1 to 5⅛ fl. ounces

What is the Specific Gravity of the Following?

Acid Nitric	1.42
Acid Hydrochloric	1.16
Acid Sulphuric	1.84
Acid Sulphurous	1.022
Acid Sulphuric Aromatic	.995
Acid Nitric Dilute	1.059
Acid Sulphuric Dilute	1.067
Acid Hydrochloric Dilute	1.049
Acid Hydrocyanic Dilute	.997
Acid Hydrobromic Dilute	1.077
Acid Acetic Dilute	1.0083
Acid Phosphoric Dilute	1.057
Alcohol	.820
Alcohol Dilute	.928
Æther	.750
Æther Fortior	.7205
Acid Oleic	0.900 to 0.918
Acid Acetic	1.045
Creasotum	1.035 to 1.08
Chloroform Venale	1.47

Chloroform	1.48 to 1.49
Glycerin	1.25
Syrupus	1.31
Spirits of Nitre	.823 to .825
Spirits Frumenti	.917
Spirits Vini Gallici	.925 to .941

Give the Dose of the Following:

Atropia Sulphate	$\frac{1}{100}$ to $\frac{1}{32}$ grain
Acid Arsenious	$\frac{1}{60}$ to $\frac{1}{12}$ grain
Acid Boric	5 to 10 gr'ns
Acid Tannic	2 to 10 gr'ns
Aconitia	$\frac{1}{400}$ to $\frac{1}{50}$ grain
Antimonii et Potassi Tartras	1 to 2 gr'ns
Argenti Nitras	$\frac{1}{6}$ to ½ grain
Argenti Oxide	½ to 2 gr'ns
Creasotum	1 to 3 Gtt
Codeine	¼ to ½ grain
Dover's Powder	3 to 10 gr'ns
Digitalinum	$\frac{1}{60}$ to $\frac{1}{80}$ grain
Digitalis	½ to 2 gr'ns
Donovan's Solution	3 to 5 Gtt
Eleterinum	$\frac{1}{16}$ to ½ gr'ns
Ergota	20 to 30 gr'ns
Ergotine	1 to 5 gr'ns
Fowler's Solution	3 to 5 Gtt
Hydrate Chloral	5 to 30 gr'ns
Hydrarg. Chlorid. Corros	$\frac{1}{6}$ to $\frac{1}{8}$ gr'ns
Hydrarg. Chlorid. Mite	½ to 10 gr'ns
Hydrarg. Iodid. Rubr	$\frac{1}{16}$ to $\frac{1}{6}$ grain
Hydrarg. Iodid. Viride	1 to 3 gr'ns
Hydrarg. Cum. Cretæ	3 to 8 gr'ns
Hydrastin	3 to 5 gr'ns
Iodoform	1 to 3 gr'ns
Ipecac—Expectorant ½ to 2. Emetic,	15 to 30 gr'ns

Jalap	15 to 30	gr'ns
Kino	10 to 30	gr'ns
Leptandrin	2 to 3	gr'ns
Lactucarium	10 to 20	gr'ns
Morphia Sulphate	⅛ to ¼	gr'ns
Oil Savin	1 to 4	Gtt
Oil Tiglii	½ to 1	Gtt
Oil Pennyroyal	1 to 4	Gtt
Oil Wormseed	3 to 6	Gtt
Oil Cubebs	10 to 12	Gtt
Opium	½ to 1	grain
Podophyllin	⅛ to ¼	grain
Potassa Iodide	3 to 10	gr'ns
Potassa Bromide	10 to 30	gr'ns
Pilocarpinum	⅛ to ¼	grain
Solution Chloride of Arsenic	3 to 5	Gtt
Santoninum	2 to 6	gr'ns
Spirits Ether Compound	30 to 60	Gtt
Spirits Ether Nitrous	30 to 120	Gtt
Spirits Ammonia Aromat	20 to 60	Gtt
Strychnia	$\frac{1}{60}$ to $\frac{1}{32}$	grain
Salicine	5 to 30	gr'ns
Tincture Aconite Leaves	10 to 20	Gtt
Tincture Aconite Root	2 to 4	Gtt
Tincture Cantharides	5 to 20	Gtt
Tincture Colchicum Root	5 to 20	Gtt
Tincture Colchicum Seed	15 to 30	Gtt
Tincture Digitalis	5 to 10	Gtt
Tincture Iodine	5 to 15	Gtt
Tincture Opium	10 to 30	Gtt
Tincture Belladonna	10 to 20	Gtt
Tincture Iron	10 to 20	Gtt
Tincture Gelsemium	10 to 12	Gtt
Tincture Hyoscyamus	30 to 60	Gtt
Tincture Lobelia	30 to 60	Gtt
Tincture Lavender Compound	30 to 60	Gtt

Tincture Myrrh	30 to 40 Gtt
Tincture Nux Vomica	3 to 6 Gtt
Tincture Opium Camphorated	30 to 120 Gtt
Tincture Bryonia	60 to 120 Gtt
Veratria	$\frac{1}{48}$ to $\frac{1}{12}$ grain
Zinc Chloride	½ to 2 grains
Zinc Oxidum	2 to 8 grains
Zinc Sulphas. As Emetic	10 to 30 grains
Zinc Valerianate	1 to 2 grains

POISONS AND ANTIDOTES.

There are three classes of poisons, viz: Irritants, which produce irritation and inflammation in the stomach.

Narcotics, which affect the brain and spinal cord, producing headache, giddiness and insensibility.

Narcotic Irritants, having the double action.

In cases of poisoning by alkalies give vinegar, oil and milk freely and produce vomiting.

For acids, give chalk, soda, lime water and demulcent drinks of flax-seed or slippery elm, then a prompt emetic.

In all ordinary cases of poisoning (unless by strong acids or alkalies), first give an emetic, fifteen grains of Sulphate of Zinc. If not at hand, give a tablespoonful of ground mustard in a glass of water. Repeat this every few minutes until the stomach is emptied. Then follow with white of eggs, milk, or chemical antidote as given below.

Acid, Carbolic—The best antidote is a mixture of olive oil and castor oil, freely administered, or a mixture of slacked lime with about three times its weight of sugar rubbed together with a little water.

Atropia....................Coffee, Tannin
Aconite................Whisky and prompt Emetics
Nitrate of Silver....................Common Salt
Digitalis.................Coffee, Brandy, Ammonia
Paris Green..............................See Arsenic
Arsenic..................Hydrated Oxide of Iron

The arsenical antidote (Hydrated oxide of iron) is prepared as follows:

To Liquor Ferri Tersulphatis add excess of Aqua Ammonia, collect the precipitate on a filter, and wash well with water.

Sugar of Lead............Epsom Salts, Lemonade
Opium................................See Morphine
Morphia..........Coffee — Keep patient in motion
Oxalic Acid..................Chalk and Emetics
Strychnine—Chloral Hydrate, 10 grains every 15 minutes; Ether and Opium
Mercury Salts.............Milk, White of Eggs
Chloral Hydrate.................See Chloroform
Chloroform—Horizontal position, cold water to the head, stimulants
Belladonna........Coffee, Tea, Tannin, Jaborandi
Blue Stone—Milk and White of Eggs in large quantities
Calomel....White of Eggs, Milk, Flour, Gluten
Gelsemium....Coffee, Brandy, Emetic of Ipecac
Laudanum....Strong Coffee—Keep patient in motion.
Prussic Acid—When taken in large doses is generally immediately fatal. In smaller doses the symptoms are weight and pain in the head, giddiness, nausea, rapid pulse, loss of muscular power, foaming at the mouth.
Antidote—Cold water to the head and spine, Carbonate of Ammonia internally, small doses of

Chloride of Lime or Soda. The chemical antidote is moist Peroxide of Iron.

Suphuric Acid—Carbonate of Soda, Lime and Magnesia. Water must not be given.

How are the following made:

ACID PYROGALLIC—By subliming Gallic Acid.

ACID BENZOIC—By the sublimation of Gum Benzoin.

ACID OXALIC—Decomposing sugar by Nitric Acid.

CHLOROFORM—By distilling a mixture of Alcohol and Chlorinated Lime.

COLLODION—By dissolving Gun Cotton in Ether and Alcohol.

COLLODION STYPTICUM—By the addition of Tannic Acid to Collodion.

COLLODION FLEXILE—By mixing Collodion, Canada Turpentine and Castor Oil,

COLLODION CANTHARIDAL—By mixing Flexile Collodion, Cantharides, and Commercial Chloroform

COLORLESS TINCTURE OF IODINE—Made by the addition of Aqua Ammonia or Soda Hyposulphite to the Tincture of Iodine.

TINCTURÆ FERRI CHLORIDI—By mixing Solution of Chloride of Iron, 35 parts; Alcohol 65 parts.

PURIFIED CHLOROFORM—Shake Commercial Chloroform with Sulphuric Acid; decant and shake with Solution of Carbonate of Soda; decant, mix with slacked lime and distill.

ACETIC ACID—By the destructive distillation of wood.

HYDROCHLORIC ACID—By the action of the Sulphuric Acid on common salt.

SULPHURIC ACID—By burning sulphur or iron pyrites and bringing the fumes in contact with steam, and the fumes formed by decomposing nitre.

Chloral Hydrate—By passing Chlorine through Alcohol.

Nitric Acid—By the action of Sulphuric Acid on Nitrate of Potash.

Spiritus Ætheris Nitrosi—By the action of Nitric Acid on Alcohol.

Iodoform—By the action of Iodine on Alcohol and Carbonate of Potash.

Æther—By the action of Sulphuric Acid on Alcohol and Chloride of Lime.

Aqua Calcis—The lime is slacked with a little water; it is then shaken with more water, and this water poured off and rejected. Then the proper amount of water is added; and allowed to stand until ready for use.

Why is the first water rejected? Because it is liable to contain other soluble salts.

What per cent. of lime does lime water contain? .15 per cent.

Alcohol Dilute—Equal parts by weight of Alcohol and water.

Quininæ Bisulphas—Prepared by the action of sulphuric acid on sulphate of quinine. The bisulphate of quinine contains 13 per cent. less alkaloid than the sulphate.

Boric Acid—By decomposing Borax with Hydrochloric Acid.

Officinal Names.

Aqua Regia	Acidum Nitrohydrochloricum
Aqua Fortis	Acidum Nitricum
American Hemp	Cannabis Americana
Aloes	Aloe

American Worm Seed	Chenopodium
Ammonio Ferric Alum	Ferriet Ammonii Sulphas
American Hellebore	Veratrum Viride
Asafetida	Asafœtida
Alum	Alumen
Balsam Peru	Balsamum Peruvianum
Balsam Tolu	Balsam Tolutanum
Benzoin	Benzoinum
Bromine	Bromum
Bearberry	Uva Ursi
Blue Flag	Iris
Black Snake Root	Cimicifuga
Benzine	Benzinum
Blue Cohosh	Caulophyllum
Bitter Sweet	Dulcamara
Buckthorn	Frangula
Balm	Melissa
Basham's Mixture	Mistura Ferri et Ammonii Acetatis
Butternut	Juglans
Black Cohosh	Cimicifuga
Blackberry	Rubus
Black Drop	Acetum Opii
Blood-root	Sanguinaria
Croton Oil	Oleum Tiglii
Caraway	Carum
Charcoal	Carbo Ligni
Creasote	Creasotum
Cranesbill	Geranium
Cacao Butter	Oleum Theobromæ
Calabar Bean	Physostigma
Cream of Tarter	Potassii Bitartras
Copperas	Ferri Sulphas
Cod Liver Oil	Oleum Morrhuæ
Citrine Ointment	Unguentum Hydrargyri Nitratis
Cotton	Gossypium
Culver's Root	Leptandra

Colombo	Calumba
Chestnut Leaves	Castanea
Cotton Root Bark	Gossypii Radicis Cortex
Chamomile	Anthemis
Canadian Hemp	Apocynum
Camphor	Camphora
Cloves	Caryophyllus
Cochineal	Coccus
Colocynth	Colocynthis
Cubeb	Cubeba
Coca Leaves	Erythroxylon
Calomel	Hydrargyri Chloridum Mite
Corrosive Sublimate	Hydrargyri Chloridum Corrosivum.
Deadly Night Shade	Belladonna
Donovan's Solution	Liquor Arsenii et Hydrargyri Iodidi.
Dogwood	Cornus
Decoctions	Decocta
Dewees' Carminative	Mistura Magnesiæ et Asafœtidæ.
Dried Alum	Alumen Exsiccatum
Elder	Sambucus
Elixir of Vitriol	Acidum Sulphuricum Aromaticum
Foxglove	Digitalis
Fowler's Solution	Liquor Potassii Arsenitis
Fig	Ficus
Fennel	Fœniculum
Goulard's Extract	Liquor Plumbi Subacetatis
Gun Cotton	Pyroxylinum
Gamboge	Cambogia
Glycerin	Glycerinum
Galbanum	Galbanum
Gelsemium	Gelsemium
Golden Seal	Hydrastis
Gum Arabic	Acacia

Gentain	Gentiana
Grindelia Robusta	Grindelia
Guaiac	Guaiaci Resina
German Chamomile	Matricaria
Ginger	Zingiber
Glauber Salts	Sodii Sulphas
Garlic	Allium
Henbane	Hyoscyamus
Hemlock	Conium
Huxham's Tincture	Tinctura Cinchonæ Composita
Hops	Humulus
Horehound	Marrubium
Hive Syrup	Syrupus Scillæ Compositus
Hoffman's Anodyne	Spiritus Ætheris Compositus
Indian Hemp	Cannabis Indica
Ipecac	Ipecacuanha
Isinglass	Ichthyocolla
Iodine	Iodum
Jaborandi	Pilocarpus
Kousso Flowers	Brayera
Ladies' Slipper	Cypripedium
Licorice	Glycyrrhiza
Lime	Calx
Litharge	Plumbi Oxidum
Lugol's Solution	Liquor Iodi Compositus
Labarraque's Solution	Liquor Sodæ Chloratæ
Lavant Wormseed	Santonica
Lard	Adeps
Malt	Maltum
Myrrh	Myrrha
Monsel's Solution	Liquor Ferri Subsulphatis
Male Fern	Aspidium
Monkshood	Aconitum
Musk	Moschus
Mace	Macis
Morphine	Morphina

Mastic	Mastiche
Marshmallow	Althæa
May Apple	Podophyllum
Nutgall	Galla
Nitrate of Silver	Argenti Nitras
Nutmeg	Myristica
Nux Vomica	Nux Vomica
Opium	Opii
Oil of Vitriol	Acidum Sulphuricum
Ox Gall	Fel Bovis
Peppermint	Mentha Piperita
Pleurisy Root	Asclepias
Pansy	Viola Tricolor
Prussic Acid	Acidum Hydrocyanicum Dilutum
Pipsissewa	Chimaphila
Phenol	Acidum Carbolicum
Pomegranate	Granatum
Pennyroyal	Hedeoma
Pinkroot	Spigelia
Prickly Ash	Xanthoxylum
Quince Seed	Cydonium
Red Precipitate	Hydrargyri Oxidum Rubrum
Rhatany	Krameria
Resin	Resina
Raspberry	Rubus Idæus
Rochelle Salts	Potassii et Sodii Tartras
Rhubarb	Rheum
Suet	Sevum
Senna	Senna
Squills	Scilla
Stronger Ether	Æther Fortior
Sugar	Saccharum
Spearmint	Mentha Viridis
Star-Anise	Illicium
Starch	Amylum
Seidlitz Powder	Pulvis Effervescens Compositus

Soap Bark	Quillaia
Savine	Sabina
Santonin	Santoninum
Sassafras Pith	Sassafras Medulla
Salicylate of Sodium	Sadii Salicylas
Scammony	Scammonium
Sugar of Milk	Saccharum Lactis
Sage	Salvia
Spiritus Mindererus	Liquor Ammonii Acetatis
Salts of Tartar	Patassii Carbonas
Saffron	Crocus
Sweet Flag	Calamus
Tar	Pix Liquida
Tartar Emetic	Antimonii et Potassii Tartras
Turlington's Balsam	Tinctura Benzoini Composita
Thoroughwort	Eupatorium
Tansy	Tanacetum
Turpentine	Terebinthina
Veratrine	Veratrina
Vanilla	Vanilla
Vallets Mass	Massa Ferri Carbonas
Virginia Snake Root	Serpentaria
Valerian	Valeriana
Willow	Salix
Wormwood	Absinthium
White Precipitate	Hydrargyrum Ammoniatum
Wahoo	Euonymus
Wintergreen	Gaultheria
Witchhazel	Hamamelis
Wild Cherry	Prunus Virginiana
White Oak	Quercus Alba
Yellow Wax	Cera Flava
Yolk of Egg	Vitellus
Zinc	Zincum

Explosive Compounds.

The following prescriptions contain most of the substances which have been found to produce explosions. Potassium Chlorate, and in fact all other Chlorates, should never be dispensed with organic, combustible or oxidizable bodies.

A mixture of Hypophosphite of lime, Chlorate of Potassium, and Lactate of Iron exploded, and nearly killed the perscription clerk who was compounding it.

Even the simple trituration of Calcium Hypophosphite is dangerous. Physicans not infrequently order a solution of Chromic acid in glycerin. But when the acid is added quickly and all at once to the glycerin, a readily explosive substance like nitro-glycerin is formed. Chlorate of potassium when mixed with tannin or muriate of morphia, often explodes. The combination of iodine and and preparations of ammonia must be made cautiously, as iodide of nitrogen is formed, which explodes on the slightest touch. Indeed, one ought to be very careful in ordering and compounding mixtures in which easily reducible substances enter, such as the chlorates, the hypophosphites, the nitrates, preparations of iodine or ammonia, chromic acid, glycerin, permanganate of potash, etc.

R.
    Argenti Oxide,
    Morphia Muriate,
    Ext. Gentian.
M. This mixture has exploded.
R.
    Turpentine,
    Acid Sulphuric.
M. Mix slowly in a large open vessel.

R.

Potassa Permanganate,
Alcohol,
Aqua.

M. Mix the alcohol and water; add the potash slowly and cork loosely.

R.

Potassa Chlorate,
Acid Tannic,
Glycerin,
Aqua.

M. Dissolve the Tannin in the Glycerin, the Potash in water, and mix.

R.

Potassa Chlorate,
Tr. Ferri Chloridi,
Glycerin.

M. This is liable to cause an explosion when warmed.

R.

Soda chlor.,
Antim. Sulph. Aurat.

M. Takes fire even when triturated very gently.

R.

Potassa Chlorate,
Pulvis Catechu.

M. Exploded when triturated.

R.

Potassa Chlorate,
Sodii (or Calcii) Hypophosphite, Aqua.

M. Dissolve the two salts separately or an explosion will occur.

R.

Potassa Permanganate,
Glycerin.

M. This is almost sure to cause an explosion.

R.
Acid Nitric,
Acid Muriatic,
Tr. Nux Vomica.
M. Exploded in about two hours.

From what Locality are the Following Obtained?

Asafœtida	Persia
Acacia	Egypt
Aconite	Asia
Aloe	Africa
Balsam Copaiba	South America
Belladonna	Europe
Balsam Peru	South America
Balsam Tolu	South America
Calabar Bean	Africa
Calisaya	South America
Camphor	China and Japan
Colocynth	Asia and Africa
Catechu	East India
Cubeb	Java
Damiana	Mexico
Digitalis	Europe
Glycyrrhiza	Europe
Gentian	Europe
Hyoscyamus	England
Ipecacuanha	South America
Jalap	Mexico
Myrrh	Arabia
Nux Vomica	India and East India Islands
Opii	Asia
Santonica	Russia
Squills	Spain and France

Senna	India
Saffron	Spain and England
Valerian	Europe

List of Changes of Official Latin Titles.

Pharmacopœia 1870.	Pharmacopœia 1880.
Acidum Muriaticum	Acidum Hydrochloricum
Aconiti Radix	Aconitum
Alcohol Fortius	Alcohol
Aloe Socotrina	Aloe
Apocynum Cannabinum	Apocynum
Arnica	Arnicæ Flores
Atropia	Atropina
Cornus Florida	Cornus
Conii Fructus	Conium
Felix Mas	Aspidium
Glycerina	Glycerinum
Granati Radicis Cortex	Granatum
Hyoscyami Folia	Hyoscyamus
Iodinium	Iodum
Iris Versicolor	Iris
Pulvis Ipecacuanhæ Compositus	Pulvis Ipecacuanhæ et Opii
Pyroxylon	Pyroxylinum
Strychnia	Strychnina
Tinctura Aconiti Radicis	Tinctura Aconiti
Tinctura Arnicæ	Tinctura Arnicæ Florum
Tinctura Aurantii	Tinctura Aurantii Amarii
Tinctura Cannabis	Tinctura Cannabis Indicæ
Tinctura Catechu	Tinctura Catechu Composita
Tinctura Iodinii	Tinctura Iodi
Veratria	Veratrina

GIVE THE INGREDIENTS OF

Pulvis Cretæ Compositus.

Prepared Chalk	30 parts
Acacia	20 parts
Sugar	50 parts

Pulvis Glycyrrhizæ Compositus.

Senna (in No. 60 Powder)	18 parts
Glycyrrhiza (in No. 60 Powder)	16 parts
Fennel (in No. 60 Powder)	8 parts
Washed Sulphur	8 parts
Sugar	50 parts

Pulvus Morphinæ Compositus.

Sulphate of Morphine	1 part
Camphor	20 parts
Glycyrrhiza (No. 70 Powder)	20 parts
Precipitated Carbonate of Calcium	20 parts
Alcohol, Q. S.	

Opium Denarcotisatum.

Powdered Opium	100 parts
Stronger Ether	1,000 parts
Sugar of Milk, Q. S.	

Pulvis Ipecacuanhæ et Opii.

Powdered Opium	1 part
Powdered Ipecac	1 part
Sugar of Milk	8 parts

Pulvis Jalapæ Compositus.

Jalap	35 parts
Bitartrate of Potassium	65 parts

Massa Hydrargyri.

Mercury	33 parts
Glycyrrhiza (No. 60 Powder)	5 parts
Althæa	25 parts
Glycerin	3 parts
Honey of Rose	34 parts

Pulvis Aromaticus.

Cinnamon	30 %	35 parts
Cardamom	15	15 parts
Nutmeg	15	15 parts
Ginger	40	35 parts

Acidum Sulphuricum Aromaticum.

Sulphuric Acid	200 parts
Tincture of Ginger	45 parts
Oil of Cinnamon	1 part
Alcohol Q. S.	1,000 parts

Tinctura Cardamomi Composita.

Cardamom	20 parts
Cinnamon	20 parts
Caraway	10 parts
Cochineal	5 parts
Glycerin	60 parts
Dilute Alcohol, Q. S.	1,000 parts

Tinctura Benzoini Composita.

Benzoin	12 parts
Purified Aloes	2 parts
Storax	8 parts
Balsam of Tolu	4 parts
Alcohol, Q. S.	100 parts

Decoctum Sarsaparillæ Compositum.

Sarsaparilla	10 parts
Sassafras	2 parts
Guaiacum Wood	2 parts
Glycyrrhiza	2 parts
Mezereum	1 part
Water, Q. S.	100 parts

Infusum Digitalis.

Digitalis	3 parts
Cinnamon	3 parts
Boiling Water	185 parts
Alcohol	15 parts
Water, Q. S	200 parts

Linimentum Saponis.

Soap	10 parts
Camphor	5 parts
Oil Rosemary	1 part
Alcohol	70 parts
Water, Q. S.	100 parts

Liquor Ferri Chloridi.

Iron	15 parts
Hydrochloric Acid	86 parts
Nitric Acid	
Distilled Water, each Q. S.	100 parts

Tinctura Opii Camphorata.

Powdered Opium	4 parts
Benzoic Acid	4 parts
Camphor	4 parts
Oil of Anise	4 parts
Glycerin	40 parts
Diluted Alcohol, Q. S.	1,000 parts

Billrott's Mixture.

Chloroform	100 parts	By volume.
Alcohol	30 "	
Ether	30 "	

A. C. E. Mixture.

Alcohol	1 part	By volume.
Chloroform	2 "	
Ether	3 "	

Synonymous Names of Common Drugs.

Acid Carbolic, Phenic Acid, Phenol.

Acid Citric, Acid of Lemons.

Acid Hydrochloric, Muriatic Acid, Acid of Salt, Spirit of Salt.

Acid Nitric, Aqua Fortis.

Acid Nitro-Hydrochloric, Acid Nitro-Muriatic, Aqua Regia.

Acid Oxalic, Acid of Sugar.

Acid Sulphuric, Oil of Vitriol, Spirit of Vitriol.

Alcohol, Rectified Spirit, Spirit of Wine.

Annotta, Annatto, Orleana, Otter.

Ammonia Aqua, Spirits of Hartshorn, Volatile Spirit, Liquor Ammonia, Solution of Ammonia, Water of Ammonia.

Ammonia Carbonate, Sesquicarbonate of Ammonia, Hartshorn, Sal Volatile.

Ammonia Muriate, Chloride of Ammonium, Hydrochlorate of Ammonia, Sal Ammoniac.

Anodyne Hoffman's, Hoffman's Drops, Compound Spirit of Ether.

Antimony, Sulphuret of, Black Antimony, Crude Antimony.

Antimony, Oxysulpharet of, Kermes Mineral.

Antimony and Potassa, Tartrate of, Tartar Emetic.

Antimonial Powder, James' Powder.

Animal Charcoal, Ivory Black.

Arsenic, White, Oxide of, the Arsenic of Commerce, Arsenious Acid, Ratsbane.

Arsenic and Potassa, Solution of, Fowler's Solution.

Arsenic and Mercury, Solution of Iodide of, Donovan's Solution.

Arsenate of Soda Solution, Pearson's Arsenical Solution.

Balsam Fir, Canada Balsam.

Bark, a general name for the species of Cinchona Bark, as Red Bark, Yellow Bark, Pale Bark, etc.

Bark, Curacoa, Bitter Orange Peel.

Bark, Black Oak, Quercitron Bark.

Benzoic Acid, Flowers of Benzoin.

Bi, Bin, and Dueto, used for double; as Bi-carbonate, Bin-oxalate, Dueto-iodide.

Bi-Chloride of Mercury, Corrossive Sublimate.

Calamus, Sweet Flag.

Chloride of Mercury, Calomel, Sub Chloride, or Mild Chloride of Mercury.

Chlorates or Chlorides, Muriates.

Chalk, French, Soapstone.

Cocculus, Indicus, Fish Berries.

Colocynth, Bitter Apple, Bitter Cucumber.

Creasote, Oil of Smoke.

Compound Tincture of Cinchona, Huxham's Tincture of Bark.

Compound Tincture of Benzoin, Jesuit's Balsam.

Copper, Sulphate of, Blue Vitriol, Blue Stone, Roman Vitriol.

Ergot, Spurred Rye, Smut Rye.

Flowers of Sulpher, Sublimed Sulphur.

Flowers of Zinc, Oxide of Zinc.

Gelatine, Isinglass, Fish Glue.

Glycerin, Oil of Soap.

Graphite, Plumbago, Black Lead.

Gypsum, Plaster of Paris, Calcined Plaster, Dentist's Plaster.

Hydriodate, used for Iodide.

Hydrocyanic Acid, Prussic Acid.

Indigo, Sulphate of, Chemic Chemic Blue.

Iron and Ammonium, Sulphate of, Iron Alum, Flores Martiales.

Iron, Oxide of, Crocus Martis, Rouge, Colcothar.

Iron, Chloride of, Solution, Perchloride of, Solution Sesquichloride of Iron, Solution Muriate of Iron.

Iron, Persulphate of, Monsel's Salts.

Iron, Persulphate of, Solution, Monsel's Solution.

Iron, Sulphate of, Copperas, Green Vitriol, Vitriol, Vitriol of Mars, Sal Martes.

Iron by Hydrogen, Reduced Iron. Quevenne's Iron.

Iron with Sugar, Vallet's Mass.

Kalium, Potash, Kali Purum, Pure Potash.

Labarraque's Liquor, Solution, Chloride of Soda.

Lac, Milk, or Milk of.

Lac Sulpher, Precipitated Sulphur.

Lead, Acetate of, Sugar of Lead, Sal Saturni and Sac Sat.

Lead, Liquor, Sub Acetate of, Goulard's Extract.

Lead, Semivitrified Oxide of, Litharge.

Liquors, Solutions.

Lunar Caustic, Nitrate of Silver, in Sticks.

Magnesia, Solution, Citrate of, Purging Lemonade

Magnesia, Sulphate of, Epsom Salts, Bitter Salts, Sal Amarum, Physical Salt.

Mercury, Quicksilver.

Mercury, Ammoniated, White Precipitate.

Mercury, Red Oxide of, Red Precipitate.

Mercury, Black Sulphuret of, Black Precipitate, Ethiop's Mineral.

Mercury, Red Sulphuret of, Cinnabar.

Mercury, Yellow Sulphate of, Turpeth Mineral, Queen's Yellow.

Mercurial Ointment, Unguentum, Blue Ointment.

Mercury with Chalk, Gray Powder.

Mercury Pill Mass, Blue Mass, Blue Pill.

Muriate of Tin, Solution, Madder, Compound.

Cochineal Compound, Tin Mordant.

Natron, Soda.

Nux Vomica, Dog Button.

Ointment Nitrate of Mercury, Citrine Ointment, Yellow Ointment.

Opium, Thebaïcum.

Opodeldoc, Soap Liniment.

Olibanum, Incense, Frankincense.

Potassium, Potassa, Potash, Pearlash.

Potassium, Binoxalate of, Acetoselle, Salts of Lemon, Salts of Sorrel

Potassium, Bitartrate of, Cream Tartar.

Potassium, Carbonate of, Sal Tartar, Salt of Wormwood.

Potassium, Nitrate of, Saltpetre, Sal Nitre.

Potassium, Nitrate of, Fused, Sal Prunella.

Potassium, Sulphuret of, Liver of Sulphur.

Potassium, Tartrate of, Soluble Tartar.

Poke, Garget.

Powder of Aloes and Canella, Hiera Picra.

Powder of Ipecac and Opium, Dover's Powder.

Proto, Single, Sub.

Snakeroot, Canada, Wild Ginger.

Soda, Bi-Carbonate of, Baking Soda.

Soda, Carbonate of, Sal Soda, Washing Soda.
Soda, Sulphate of, Glauber's Salts, Horse Salts.
Soda, Tartrate of, and Potassa, Rochelle Salts.
Syrup Squills, Compound, Hive Syrup.
Syrup of Phosphates Compound, Chemical Food.
Tincture Opium, Tincture Thebaica, Laudanum.
Tincture Opium Acetated, Black Drop.
Tincture Opium Camphorated, Tincture Camphor Compound, Paregoric, Elixir Paregoric.
Treacle, Theriaca, Molasses.
Wine of Antimony, Antimonial Wine, Wine of Tartar Emetic.
Yellow Root, Hydrastis, Golden Seal, Yellow Puccoon.
Zinc, Sulphate of, White Vitrol

BOTANY.

THE INORGANIC WORLD OR MINERAL KINGDOM.—The earth itself, with the air that surrounds it, and all things naturally belonging to them which are destitute of life, make up the mineral kingdom, or inorganic world. These are called *inorganic* or unorganized, because they are not composed of *organs*, that is, of parts which answer to one another, and make up a whole. They were formed, but they did not grow, nor proceed from previous bodies like themselves, nor have they the power of producing other similar bodies.

THE ORGANIC WORLD.—The organic world consists of two kinds of beings, namely: First *Plants* or *Vegetables*, which make up what is called the *Vegetable Kingdom;* and second *Animals*, which compose the *Animal Kingdom.* These consist of *organs*; of parts which go to make up an *individual*, a *being*. And each individual owes its existence to a preceding one like itself, that is, to a parent. It was not merely formed, but *produced*. At first, small and imperfect, it grows and develops by powers of its own; it attains maturity, becomes old, and finally dies. It was formed of inorganic or mineral matter, that is, of earth and air, indeed; but only of this matter under the influence of life.

The difference between plants and animals seem at first sight so obvious and so great, that it would appear more natural to inquire how they resemble rather than how they differ from each other. What likeness does the cow bear to the grass it feeds upon? The one moves freely from place to place, in obedience to its own will, as its wants or convenience require; the other is fixed to the spot of earth where it grew, manifests no will, and makes no movements that are manifest to ordinary observation. The one takes its food into an internal cavity (the stomach), from which it is absorbed into the system; the other absorbs its food directly by its surface, by its roots, leaves, etc. Both possess organs, but the limbs or members of the animal do not at all resemble the roots, leaves, blossoms, etc., of the plant. All these distinctions; however, gradually disappear, as we come to the lower kinds of plants and the lower animals.

Botany is the name of the science of the vegetable kingdom in general. Physiology is the study of living beings.

THE COURSE OF VEGETATION. — We see plants growing from the seed in spring time, and gradually developing their parts; at length they blossom, bear fruit, and produce seed like those from which they grew.

To study plant life, it is best to begin with the seed and trace the plant's growth from the very beginning.

Every seed contains a rudimentary plantlet called an *Embryo*.

Its little stem is named the *Radicle*, because it was supposed to be the root. Its seed-leaves it bears on its summit are technically called *Cotyledons*. The little bud of undeveloped leaves, which is to be found between the cotyledons before germinating in many cases (as in the pea and bean), has been named the *Plumule*.

In the seed, either in the embryo itself or around it, the mother plant has stored up the proper nourishing matter, or prepared food, of which the root is to be made up, and the plantlet is to be nourished until it is able to provide for itself.

When the seed is placed in the soil provided with the proper warmth and moisture, it soon begins its growth, the root is formed from the surrounding nourishment, the stem or radicle is lengthened, and the plumule enveloped in the cotyledons, are pushed up to the light and air. The cotyledons open out and the plumule grows up on a stem and opens out a second pair of leaves, and continues to grow upward in joints each from the summit of the one below.

The opposite growth of root and stem began at the beginning of germination, and it continues through the whole life of the plant. While yet buried in the soil, and perhaps in total darkness, as soon as it begins to grow, the stem end of the embryo points toward the light—curving or turning quite around, if it happens to lie in some other direction—and stretches upward into the free air and sunshine; while the root end as uniformly avoids the light, bends in the opposite direction to do so if necessary, and ever seeks to bury itself more and more in the earth.

But the object of this instinct is obvious. It places the plant from the first in the proper position, with its roots in the moist soil, from which they are to absorb nourishment, and its leaves in the light air, where alone they can fulfil their office of digesting what the roots absorb.

The different mode of growth of root and stem may also be here mentioned. Each grows, not only in a different direction but in a different way. The stem grows by producing a set of joints, each from the summit of its predecessor; and each joint elongates throughout every part, until it reaches its full length. The root is not composed of joints, and it lengthens only at the end,

So the seedling plantlet finds itself provided with all the organs of vegetation that even the oldest plant possesses—namely, root, stem, and leaves; and has these placed in the situation where each is to act—the root in the soil, the foliage in the light and air. Thus established, the plantlet has only to set about its proper work.

THE KINDS OF EMBRYO AS TO THE NUMBER OF COTYLEDONS—The embryo heretofore spoken of consists of a radicle or stemlet, with a pair of cotyledons on its summit. Botanists therefore call it *dicotyledonous*—an inconveniently long word to express the fact that the embryo has two cotyledons or seed-leaves

In many plants, however, the embryo has only one cotyledon, and it is therefore termed by the botanists *monocotyledonous*—an extremely long word, like the other, of Greek derivation, which means *one-cotyledoned*. The rudiments of one or more other leaves are, indeed, commonly present in this sort of embryo, as is plain to see in Indian corn, but they form a bud situated above or within the cotyledon, and enclosed by it more or less completely, so that they evidently belong to the plumule; and these leaves appear in the seedling plantlet, each from within its predecessor, and therefore originating higher up on the forming stem.

The monocotyledonous embryo is simpler than the former, consisting apparently of a simple oblong or cylindrical body, in which no distinction of parts is visible; the lower end is radicle, and from it grows the root; the rest is a cotyledon, which has wrapped up in it a minute plumule, or bud, that shows itself when the seeds sprout in germination. The first leaf which appears above ground in all these cases is not the cotyledon. In all seeds with one cotyledon to the embryo, this remains in the seed, or at least its upper part, while its lengthening base comes out, so as to extricate the plumule, which shoots upward, and develops the first leaves of the plantlet. These appear one above or within the other in succession, the first commonly in the form of a little scale or imperfect leaf, the second or third and the following ones as the real, ordinary leaves of the plant. Meanwhile, from the root end of the embryo, a root, or soon a whole cluster of roots, make its appearance.

The Growth of Plants from Buds and Branches.

We have now seen how the plant grows so as to produce a root, and a simple stem with its foliage. Both the root and stem, however, generally branch.

The branches of the roots arise without any particular order. There is no telling beforehand from what part of a main root they will spring. But the branches of the stem, except in some extraordinary cases, regularly arise from a particular place. Branches or shoots in their undeveloped state are *buds*. These regularly appear in the *axils* of the leaves — that is, in the angle formed by the leaf with the stem on the upper side; and as leaves are symmetrically arranged on the stem, the buds, and the branches into which the buds grow, necessarily partake of this symmetry. In growing, buds lengthen into branches, just as the original stem did from the plumule of the embryo.

The leaves are arranged in two principal ways: they are either *opposite* or *alternate*. Leaves are *opposite* when the two leaves in such cases being always opposite each other, that is, on exactly opposite sides of the stem, and there are two borne on the same joint of stem. Leaves are *alternate* when there is only one from each joint, not counting the seed-leaves, which of course are opposite, there being a pair of them. Consequently the axillary buds are also alternate, as in hickory; and the branches they form alternate—making a different kind of spray from the other mode—one branch shooting on the side of the stem and the next on some other. For in the alternate arrangement no leaf is on the same side of the stem as the one next above or next below it.

THE PARTS OF THE LEAF.—The principal part of a leaf is the blade, or expanded portion, one face of which naturally looks toward the sky, the other toward the earth. The blade is often raised on a stalk of its own, and on each side of the stalk at its base there is sometimes an appendage called a *stipule*. A complete leaf, therefore, consists of a *blade*, a *foot-stalk* or *leaf-stalk*, called the *petiole*, and a pair of *stipules*.

NATURE AND USE OF THE FLOWER--The object of the flower is the production of seed. The flower consists of all those parts, or organs which are subservient to this end. Some of these parts are necessary to the production of seed. Others serve merely to protect or support the more essential parts.

THE ESSENTIAL ORGANS OF THE FLOWER.—These are placed one above or within the other; namely, first, the *Stamens* or fertilizing organs, and second, the *Pistils*, which are to be fertilized and bear the seed.

Surrounding the stamens and pistils is the *Corolla*, each leaf or separate piece of which is called a *Petal*. Surrounding the corolla and forming the outer envelope of the flower is the *Calyx*, each leaf of which is called a *Sepal*.

A stamen consists of two parts, namely, the *Filament* or stalk and the *Anther*. The latter is the only essential part. It is a case, commonly with two lobes or cells, each opening lengthwise by a slit, at the proper time, and discharging a powder or dust-like substance, usually of yellow color. This powder is the *Pollen*, or fertilizing matter to produce which is the sole office of the stamen.

A pistil is distinguished into three parts, namely—beginning from below—*Ovary*, the *Style*, and the *Stigma*. The ovary is the hollow case or young pod containing rudimentary seeds, called *Ovules*.

The style is the tapering part above, sometimes long and slender, sometimes short, and not rarely altogether wanting, for it is not an essential part, like the two others. The stigma is the tip or some other portion of the style (or of the top of the ovary when there is no distinct style), consisting of loose tissue, not covered, like the rest of the plant, by a skin or epidermis. It is upon the stigma that the pollen falls; and the result is that the ovules contained in the ovary are fertilized and become seeds, by having an embryo formed in them. To the pistil, therefore, all the other organs of the blossom are in some way or other subservient; the stamens furnish pollen to fertilize its ovules; the corolla and the calyx form coverings which protect the whole.

CRYPTOGAMOUS PLANTS. Plants of the lower order of vegetation, such as Ferns, Mosses, Lichens, Fungi and Mushrooms do not bear blossoms, (with stamens and pistils), nor seed. Instead of seed they have spores, which are usually simple cells, from which the new plant grows.

THE FRUIT. The ripened ovary, with its contents, becomes the *Fruit*. When the tube of the calyx adheres to the ovary, it also becomes a part of the fruit; sometimes it even forms the principal bulk of it, as in the apple and pear.

THE SEED. The ovules, when they have an embryo (or undeveloped plantlet) formed in them, become seeds.

The *Pepo*, or *Gourd-Fruit*, is a sort of berry which belongs to the Gourd family, mostly with a hard rind and the inner portion softer. The pumkin, squash, cucumber, and melon are the principal examples.

The *Pome* is the name applied to the apple, pear and quince; fleshy fruits like a berry, but the principal thickness is calyx, only the papery pods arranged like a star in the core really belongs to the pistil itself.

The *Tuber* is a thickened portion of a rootstock.

The *Rootstock*, or *Rhizoma*, in its simplest form, is merely a creeping stem or branch growing beneath the surface of the soil, or partly covered by it.

THE FORMS OF STEMS AND BRANCHES ABOVE GROUND.—The stem is accordingly—

Herbaceous, when it dies down to the ground every year, or after blossoming.

Suffrutescent, when the bottom of the stem above the soil is a little woody, and inclined to live from year to year.

Suffrutiscose, when low stems are decidedly woody below, but herbaceous above.

Fruticose, or *shrubby*, when woody, living from year to year, and of considerable size—not, however, more than three or four times the height of a man.

Arborescent, when tree-like in appearance, or approaching a tree in size.

Diffuse, when loosely spreading in all directions,

Declined, when turned or bending over to one side.

Decumbent, reclining on the ground, as if too weak to stand.

Assurgent, or *ascending*, when rising obliquely upwards.

Procumbent, when lying flat on the ground from the first.

Creeping or *repent*, when prostrate stems on or just beneath the ground strike root as they grow; as does the White Clover.

An *annual herb* flowers in the first year, and dies, root and all, after ripening its seed: Mustard, Peppergrass, Buckwheat etc., are examples.

A *biennial herb*—such as the turnip, carrot, beet cabbage—grows the first season without blossoming, survives the winter, flowers after that, and dies, root and all, when it has ripened its seed.

A *perennial herb* lives and blossoms year after year, but dies down to the ground, or near it, annually—not, however, quite down to the root, for a portion of the stem, with its buds, still survives, and from these buds the shoots of the following year arise.

A *Shrub* is a perennial plant, with woody stems which continue alive and grow year after year.

A *Tree* differs from a shrub only in its greater size.

BOTANICAL ORIGIN.

Give the Botanical Name of the plant from which derived and part used of the following:

Absinthium—The leaves and tops of Artemisia Absinthium. Nat. Ord. Compositæ.

Acacia—A gummy exudation from Acacia Verek Nat. Ord. Leguminosæ.

Aconitum—The tuberous root of Aconitum Napellus. Nat. Ord. Ranunculaceæ.

Allium—The bulb of Allium Sativa. Nat. Ord. Liliaceæ.

Alœ—The inspissated juice of the leaves of Aloe Socotrina. Nat. Ord. Liliaceæ.

Althæa—The root of Althæ Officinalis. Nat. Ord. Malvaceæ.

Anisum—The fruit of Pimpinella Anisum. Nat. Ord. Magnoliaceæ.

Anthemis—The flower heads of Anthemis Nobilis. Nat. Ord. Compositæ.

Apocynum—The root of Apocynum Cannabinum. Nat. Ord. Apocynaceæ.

Arnicæ Flores—The flower heads of Arnica Montana. Nat. Ord. Compositæ.

Asafœtida—A gum resin from the root of Ferula Narthex. Nat. Ord. Umbelliferæ.

Asclepias—The root of Asclepias Tuberosa. Nat. Ord. Asclepiadaceæ.

Aspidium—The rhizome of Aspidium Filix-mas. Nat. Ord. Felices.

Balsamum Peruvianum—A balsam obtained from Myroxylon Pereiræ. Nat. Ord. Leguminosæ.

Balsamum Tolutanum—A balsam obtained from Myroxlon Toluifera. Nat. Ord. Leguminosæ.

Belladonnæ Folia—The leaves of Atropa Belladonna. Nat. Ord. Solanaceæ.

Benzonium—A balsamic resin obtained from Styrax Benzoin. Nat. Ord. Styraceæ.

Brayera—The female inflorescence of Brayera Anthelmintica. Nat. Ord. Rosaceæ.

Bryonia—The root of Bryonia Alba and Bryonia Dioica. Nat. Ord. Cucurbitaceæ.

Buchu—The leaves of Barosma Betulina. Nat. Ord. Rutaceæ.

Calamus—The rhizome of Acorus Calamus. Nat. Ord. Araceæ.

Calendula—The fresh flowing herb of Calendula Officinalis. Nat. Ord. Compositæ.

Calumba—The root of Jateorrhiza Calumba. Nat. Ord. Menispermaceæ.

Camphora—A stearopten derived from Cinnamomum Camphora. Nat. Ord. Myrtaceæ.

Cannabis Americana—Cannabis Sativa. Nat. Ord. Urticaceæ.

Cannabis Indica—The flowering tops of the female plant of Cannabis Sativa. Nat. Ord. Urticaceæ.

Capsicum—The fruit of Casicum Fastigiatum. Nat. Ord. Solanaceæ.

Cardamomum—The fruit of Ellattaria Cardamomum. Nat. Ord. Zingiberaceæ.

Carum—The fruit of Carum Carvi. Nat. Ord. Umbelliferæ.

Caryophyllus—The unexpanded flowers of Eugenia Caryophyllata. Nat. Ord. Myrtaceæ.

Castanæ—The leaves of Castanea Vesca. Nat. Ord. Cupuliferæ.

Catechu—An extract prepared from the wood of Acacia Catechu. Nat. Ord. Leguminosæ.

CETRARIA—Cetraria Islandica. Nat. Ord. Lichenes.

CHENOPODIUM—The fruit ot Chenopodium Ambrosioides. Nat. Ord. Chenopodiaceæ.

CHIMAPHILA—The leaves of Chimaphila Umbellata. Nat. Ord. Ericaceæ.

CHIRATA—Ophelia Chirata. Nat. Ord. Gentianceæ.

CHONDRUS—Chondrus Crispus and Chondrus Racemosa. Nat. Ord. Algæ.

CIMICIFUGA—The rhizome and rootlets of Cimicifuga Racemosa. Nat. Ord. Ranunculaceæ.

CINCHONA—The bark of any species of Cinchona. Nat. Ord. Rubiaceæ

CINCHONA FLAVA—The bark of the trunk of Cinchona Calisaya. Nat. Ord. Rubiaceæ.

CINCHONA RUBRA—The bark of the trunk of Cinchona Succirubra, Nat. Ord. Rubiaceæ.

COLCHICI RADIX—The corm of Colchicum autumnale. Nat. Ord. Melanthaceæ.

COLCHICI SEMEN—The seed of Colchicum autumnale. Nat. Ord. Melanthaceæ.

COLOCYNTHIS—The fruit of Citrullus Colocynthis. Nat. Ord. Cucurbitaceæ.

CONIUM—The full grown fruit of Conium maculatum. Nat. Ord. Umbelliferæ.

CORNUS—The bark of the root of Cornus florida. Nat. Ord. Cornaceæ.

CROCUS—The stigmas of Crocus sativus. Nat. Ord. Iridaceæ.

CUBEBA—The unripe fruit of Cubeba officinalis. Nat. Ord. Piperaceæ.

CYDONIUM—The seed of Cydonia vulparis. Nat. Ord. Rosaceæ.

CYPRIPEDIUM—The rhizome and rootlets of Cypripedium pubescens. Nat. Ord. Orchidaceæ.

DIGITALIS—The leaves of the Digitalis purpurea. Nat. Ord. Scrophulariaceæ.

Dulcamara—The young branches of Solanum Dulcamara. Nat. Ord. Solanaceæ.

Ergota—The sclerotium of Claviceps purpurea. Nat. Ord. Fungi.

Erythroxylon—The leaves of Erythyroxylon Coca. Nat. Ord. Erythroxylaceæ.

Eucalyptus—The leaves of Eucalyptus globulus. Nat. Ord. Myrtaceæ.

Eupatorium—The leaves and flowering tops of Eupatorium perfoliatum. Nat. Ord. Compositæ.

Euonymus—The bark of Euonymus atropurpurens. Nat. Ord. Celastraceæ.

Ficus—The fleshy receptacle of Ficus Carica. Nat. Ord. Urticaceæ.

Fœniculum—The fruit of Fœniculum vulgare. Nat. Ord. Umbelliferæ.

Frangula—The bark of Rhamnus Frangula. Nat. Ord. Rhamnaceæ.

Galbanum—A gum-resin from Ferula galbaniflua. Nat. Ord. Umbelliferæ.

Galla—Excrescences on Quercus lusitanica. Nat. Ord, Cupuliferæ.

Gaultheria—The leaves of Gaultheria procumbens. Nat. Ord. Ericaceæ.

Gelsemium—The rhizome and rootlets ot Gelsemium sempervirens. Nat. Ord. Loganiaceæ.

Gentiana—The root of Gentiana lutea. Nat. Ord. Gentianaceæ.

Geranium—The rhizome of Geranium maculatum. Nat. Ord. Geraniaceæ.

Glycyrrhiza—The root of Glycyrrhiza glabra. Nat. Ord. Leguminosæ.

Gossypium—The hairs of the seed of Gossypium herbaceum. Nat. Ord. Malvaceæ.

Granatum—The bark and root of Punica Granatum. Nat. Ord. Granataceæ.

GRINDELIA—The leaves and flowering tops of Grindelia robusta. Nat. Ord. Compositæ.

GUAIACA RESINA—The resin of the wood of Guaiacum officinale. Nat. Ord. Zygophyllaceæ

GUARANA—A dry paste prepared from the crushed seeds of Paullinia sorbilis. Nat. Ord. Sapindaceæ.

HÆMATOXYLON—The heart wood of Hæmatoxylon Campechianum. Nat. Ord. Leguminosæ.

HAMAMELIS—The leaves of Hamamelis Virginica. Nat. Ord. Hamamelaceæ.

HEDEOMA—The leaves and tops of Hedeoma pulegioides. Nat. Ord. Labiatæ.

HUMULUS—The strobiles of Humulus Lupulus. Nat. Ord. Urticaceæ.

HYDRASTIS—The rhizome and rootlets of Hydrastis Canadensis. Nat. Ord. Ranunculaceæ.

HYOSCYAMUS—The leaves of Hyoscyamus Niger. Nat. Ord. Solanaceæ.

IGNATIA—The seed of Strychnos Ignatia. Nat. Ord. Loganiaceæ.

ILLICIUM—The fruit of Illicium anisatum. Nat. Ord. Magnoliaceæ.

IPECACUANHA—The root of Cephælis Ipecacuanha. Nat. Ord. Rubiaceæ.

IRIS—The rhizome and rootlets of Iris versicolor. Nat. Ord. Iridaceæ.

JALAPA—The Tuberous root of of Exoginum Purga. Nat. Ord. Rubiaceæ.

JUGLANS—The inner bark of the root of Juglans Cineræ. Nat. Ord. Juglandaceæ.

JUNIPERUS—The fruit of Juniperus Communis. Nat. Ord. Convolvulaceæ.

KAMALA—The glands and hairs from the capsules of Mallatous philippinensis. Nat. Ord. Euphorbiaceæ.

Kino—The inspissated juice of Pterocarpus Marsupium. Nat. Ord, Leguminosæ.

Krameria—The root of Krameria Triandra. Nat. Ord. Polygalaceæ.

Lactucarium—The concrete milk-juice of Lactuca virosa. Nat. Ord.Compositæ.

Lappa—The root of Lappa officinalis. Nat. Ord. Compositæ.

Lavandula—The flowers of Lavandula Vera. Nat. Ord. Labiatæ.

Leptandra—The rhizome and rootlets of Leptandra Virginica. Nat. Ord. Scrophulariaceæ.

Linum—The seed of Linum usitatissimum. Nat. Ord. Linaceæ.

Lobelia—The leaves and tops of Lobelia inflata. Nat. Ord. Lobeliaceæ.

Lupulinum—The glandular powder seperated from the strobiles of Humulus Lupulus. Nat. Ord. Urticaceæ.

Lycopodium—The sporules of Lycopodium Clevatum. Nat. Ord. Lycopodaceæ.

Macis—The arillus of the fruit of Myristica fragrans. Nat. Ord. Myristicaceæ.

Maltum—The seed of Ordeum distichum caused to enter the incipient stage of germination by arificial means and dried. Nat. Ord. Graminaceæ.

Manna—The concrete saccharine exudation of Fraximus Ornus. Nat. Ord. Oleaceæ.

Marrubium—The leaves and tops of Marrubium vulgare. Nat. Ord. Labiatæ.

Mastiche—A concrete resinous exudation from Pistacia Lentiscus. Nat. Ord. Terebinthaceæ.

Matricaria—The flower heads of Matricaria Chamomilla. Nat. Ord. Compositæ.

Malissa—The leaves and tops of Melissa officinalis. Nat. Ord. Labiatæ.

MENTHA PIPERTIA—The leaves and tops of Mentha Pipertia. Nat. Ord. Labiatæ.

MENTHA VIRIDIS—The leaves and tops of Mentha Viridis. Nat. Ord. Labiatæ.

MEZEREUM—The bark of Daphne Mezereum. Nat. Ord. Thymelaceæ.

MYRISTICA—The kernel of the seed of Myristica fragrans. Nat. Ord. Myristicaceæ.

MYRRHA—A gum resin obtained from Balsamodendron Myrrha. Nat. Ord. Burseraceæ.

NUX VOMICA—The seed of Strychnos Nux Vomica. Nat. Ord. Loganiaceæ.

OPIUM—The concrete milky exudation obtained in Asia Minor by incising the unripe capsules of Papaver Somniferum. Nat. Ord. Papaveraceæ.

PEPO—The seed of Cucurbita Pepo. Nat. Ord. Cucurbitaceæ.

PHYSOSTIGMA—The seed of Physostigma venenosum. Nat. Ord. Leguminosæ.

PHYTOLACEÆ BACCA—The fruit of Phytolacca decandra. Nat. Ord. Phytolaccaceæ.

PILOCARPUS—The leaflets of Pilocarpus pennetifolius. Nat. Ord. Rutaceæ.

PIPER—The unripe fruit of Piper nigrum. Nat. Ord. Piperaceæ.

PODOPHYLLUM—The rhizome and rootlets of Podophyllum peltatum. Nat. Ord. Berberidaceæ.

PRUNUS VIRGINIANA—The bark of Prunus serotina. Nat. Ord. Rosaceæ.

PULSATILLA—The herb of Anemone Pulsatilla and Anemone patens. Nat. Ord. Ranunculaceæ.

PYRETHRUM—The root of Anacyclus Pyrenthrum. Nat. Ord. Compositæ.

QUASSIA—The wood of Picræna excelsa. Nat. Ord. Simarubaceæ.

QUERCUS ALBA--The bark of Quercus Alba. Nat. Ord. Cupuliferæ.

QUILLAIA—The bark of Quillaia Saponaria. Nat. Ord. Rosaceæ.

RHEUM—The root of Rhuem officinale. Nat. Ord. Polygonaceæ.

RHUS GLABRA—The fruit of Rhus Glabra. Nat. Ord. Terebinthaceæ.

RHUS TOXICODENDRON—The leaves of Rhus Toxicodendron. Nat. Ord. Terebinthaceæ.

RUBUS—The bark of the root of Rubus Villosus. Nat. Ord. Rosaceæ.

RUBUS IDÆUS— The fruit of Rubus Idæus. Nat. Ord. Rosaceæ.

RUMEX—The root of Rumex Crispus. Nat. Ord. Polygonaceæ.

SABINA—The tops of Juniperus Sabina. Nat. Ord. Coniferæ

SALVIA—The leaves of Salvia officinalis. Nat. Ord. Labiatæ.

SAMBUCUS—The flowers of Sambucus Canadensis. Nat. Ord. Caprifoliaceæ.

SANGUINARIA—The rhizome of Sanguinaria Canadensis. Nat. Ord. Papaveraceæ.

SANTONICA—The unexpanded flower heads of Artemisia maritima. Nat. Ord. Compositæ.

SARSPARILLA—The root of Smilax offidinalis. Nat. Ord. Smilaceæ.

SASSAFRAS—The bark of the root of Sassafras officinalis. Nat. Ord. Lauraceæ.

SASSAFRAS MEDULLA—The pith of Sassafras officinalis. Nat. Ord. Lauraceæ.

SALIX—The bark of Salix Alba. Nat. Ord. Salicaceæ.

SCAMMONIUM—A resinous exudation from the root of Convolvulus Scammonia. Nat. Ord. Convolvulaceæ.

SCILLA—The sliced bulb of Urginea Scilla. Nat. Ord. Liliaceæ.

SCOPARIUS—The tops of Sarothamnus Scoparius. Nat. Ord. Leguminosæ.

SENEGA—The root of Polygala Senega. Nat. Ord. Polygalaceæ.

SENNA—The leaflets of Cassia Acutifolia. Nat. Ord. Leguminosæ.

SERPENTARIA—The rhizome and rootlets of Aristolochia Serpentaria. Nat. Ord. Aristolochiaceæ.

SPIGELIA—The rhizome and rootlets of Spigelia marilandica. Nat. Ord. Loganiaceæ.

STAPHISAGRIA—The seed of Delphinium Staphisagria. Nat. Ord. Ranunculaceæ.

STILLINGIA—The root of Stillingia sylvatica. Nat. Ord. Euphorbiaceæ.

STRAMONII FOLIA—The leaves of Datura Stramonium. Nat. Ord. Solanaceæ.

STYRAX—The balsam prepared from the inner bark of Liquidambar orientalis. Nat. Ord. Hamamelaceæ.

TANACETUM—The leaves and tops of Tanacetum vulgare. Nat. Ord. Compositæ.

TARAXACUM—The root of Taraxacum Dens-leonis. Nat. Ord. Compositæ.

TRAGACANTHA—A gummy exudation from Astragalus gummifera. Nat. Ord. Leguminosæ.

ULMUS—The inner bark of Ulmus fulva. Nat. Ord. Urticaceæ.

USTILAGO—Ustilago Maydis grown upon Zea Mays. Nat. Ord. Fungi.

UVA URSI—The leaves of Arctostaphylos Uva-ursi. Nat. Ord. Ericaceæ.

VALERIANA—The Rhizome and rootlets of Valeriana officinalis. Nat. Ord. Valerianaceæ.

VANILLA—The fruit of Vanilla planifolia. Nat. Ord. Orchidaceæ.

VERATRUM VIRIDE—The rhizome and rootlets of Veratrum viride. Nat. Ord. Melanthaceæ.

VIBURNUM—The bark of Viburnum prunifolium. Nat. Ord. Caprifoliaceæ.

VIOLA TRICOLOR—The flowering herb of Viola Tricolor. Nat. Ord. Violaceæ.

XANTHOXYLUM—The bark of Xanthoxylum fraxineum. Nat. Ord. Rutaceæ.

ZINGIBER—The rhizome of Zingiber officinale. Nat. Ord. Zingiberaceæ.

Drugs of Animal Origin.

ADEPS—The prepared internal fat of the abdomen of Sus scrofa.

OLEUM ADIPIS—A fixed oil expressed from lard at a low temperature.

SEVUM—The internal fat of the abdomen of Ovis aries purified by melting and straining.

PEPSINUM SACCHARATUM—Pepsin is the digestive principle of the gastric juice, obtained from the mucous membrane of the stomach of the hog.

MOSCHUS—The dried secretion from the perputial follicles of Moschus moschiferus.

ACIDUM LACTICUM—A liquid composed of 75 per cent. of absolute Lactic acid and 25 per cent. of water.

SACCHARUM LACTIS—A crystalline sugar obtained from the whey of cow's milk.

FEL BOVIS—The fresh gall of Bos Taurus.

CETACEUM—A concrete, fatty substance, obtained from Physeter macrocephalus.

ICHTHYOCOLLA—The swimming-bladder of Acipenser Huso.

OLEUM MORRHUÆ—A fixed oil obtained from the fresh livers of Gadus Morrhua.

Vitellus—The yolk of the egg of Gallus Bankiva.
Cantharis—The insect Cantharis vesicatoria.
Coccus—The dried female of Coccus cacti.
Cera Flava—A concrete substance prepared by Apis mellifica.
Cera Alba—Yellow wax bleached.

TABLE OF SOLUBILITIES.

Acid Arsenious	75	parts	of	water
Acid Benzoic	500	"	"	"
Acid Carbolic	30	"	"	"
Acid Oxalic	8	"	"	"
Acidum Boricum	25	"	"	"
Acidum Salicylicum	450	"	"	"
Acidum Tannicum	6	"	"	"
Antimonii et Potassii Tartras	17	"	"	"
Atropia	300	"	"	"
Codeina	80	"	"	"
Copper, Sulph	3	"	"	"
Hydrargyri Chloridum Corrosivum	16	"	"	"
Hydrate Chloral	1	"	"	"
Lead Acetate	2	"	"	"
Magnesii Sulphas	1	"	"	"
Morphia, Muriate	20	"	"	"
Morphia, Sulphate	2	"	"	"
Potassa, Acetate	2	"	"	"
Potassa, Bromide	5	"	"	"
Potassa, Chlorate	17	"	"	"
Potassa, Iodide	1	"	"	"
Potassa, Permang	16	"	"	"
Soda, Bi-Carb	10	"	"	"
Soda, Borate	5	"	"	"
Strychnia, Sulph	48	"	"	"
Zinc, Sulphate	1	"	"	"

SPECIMENS.

It is customary at examinations in pharmacy to place before the student specimens of different drugs and chemicals to be identified. As the ability to identify drugs and chemicals is an important feature in the education of a pharmacist, we advise you to accustom yourself to recognize at sight the more common articles handled in the stores. Below we give a list of the specimens generally given to be recognized:

Acidum Aceticum
Acidum Arseniosum,
Acidum Benzoicum,
Acidum Boricum
Acidum Carbolicum,
Acidum Citricum,
Acidum Gallicum,
Acidum Salicylicum,
Acidum Tannicum,
Aloe,
Alumen,
Anisum,
Anthemis,
Arnicæ Flores,
Asafœtida,
Balsamum Tolutanum,
Belladonnæ Folia,
Calumba,
Camphora,
Cambogia,
Fœniculum,
Galla,
Gentiana,
Glycerinum,
Guaiaci Resina,
Cantharis,
Cardamomum,
Carum,
Caryophyllus,
Cascarilla,
Catechu,
Cera Alba,
Chloral,
Chondrus,
Cetaceum,
Cimicifuga,
Cinchona Flava,
Cinchona Rubra,
Coccus,
Crocus,
Cubeba,
Ergota,
Ferri Sulphas,
Ferri Sulphas Exsiccatus,
Ferrum Reductum,
Rosmarinus,
Sambucus,
Sanguinaria,
Santonica,
Scilla,

Humulus,
Hydrastis,
Illicium,
Iris,
Kino,
Lavandula,
Macis,
Magnesii Sulphus,
Matricaria,
Pimenta,
Piper.
Pepo,
Prunus Virginiana,
Phytolaccæ Bacca,
Pix Burgundica,
Potassii Bicarbonas,
Potassii Bromidum,
Potassii Chloras,
Potassii Iodidum,
Potassii Nitras,
Quassia,
Rheum.
Senega,
Senna,
Serpentaria,
Sinapis Alba,
Sinapis Nigra,
Sodii Bicarbonas,
Sodii Boras,
Sodii Hypophosphis,
Sodii Salicylas,
Spiritus Ætheris Nitrosi,
Sulphur Lotum,
Sulphur Præcipitatum,
Tinctura Opii,
Tinctura Opii Camphorata,
Tinctora Valerianæ,
Tragacantha,
Ulmus,
Valeriana,
Xanthoxylum,
Zinci Sulphas,
Zingiber.

To loosen Glass Stoppers.

Some one of the following methods is certain to prove effective:

1. Hold the bottte firmly in the hand or between the knees and gently tap the stopper on alternate sides, using for the purpose a small piece of wood, and directing the strokes upward.

2. Plunge the neck of the vessel in hot water, taking care that the water is not hot enough to split the glass. If the stopper is still fixed, use the first method.

3. Pass a piece of twine around the neck of the bottle, which must be held fast while two persons draw the twine backward and forward.

4. Warm the neck of the vessel before the fire and when it is nearly hot the stopper can be removed.

5. Put a few drops of oil around the stopper where it enters the glass vessel which may then be warmed before the fire. Then apply process No. 1. If the stopper still continues immovable, repeat the above process until it gives way, which it is almost sure to do in the end.

6. Take a steel pin or needle and run it round the top of the stopper in the angle formed by it and the bottle. Then hold the vessel in your left hand and give it a steady twist toward you with the right, and it will very soon be effectual. If this does not succeed, try process No. 5 which will be facilitated by it.

Pharmacy Laws.

All the states and territories, with the following exceptions, now have pharmacy laws.

Alaska.
Arizona,
Indiana.
Maryland.
Montana.
Nevada.
Tennessee.
Vermont.
Indian Territory.

Diplomas from Colleges of Pharmacy entitle the holders to registration in all states but the following:

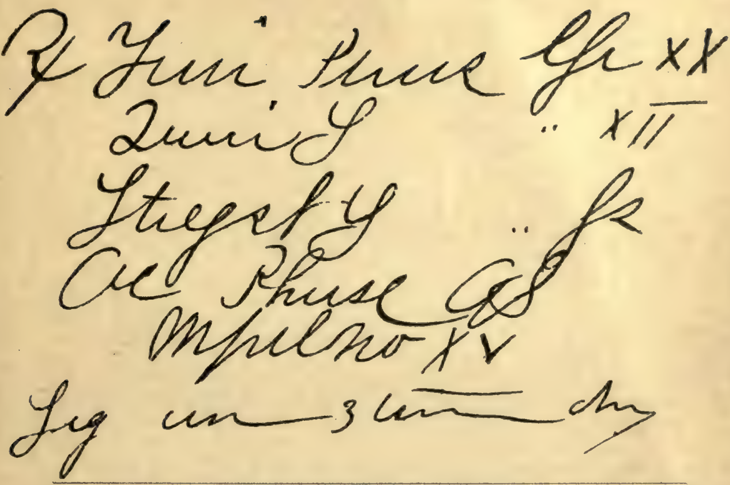
Illinois
Massachusetts.
Michigan.
Mississippi.
New York.
Ohio.
Pennsylvania.

Persons registered in other states are registered without examination at the option of the boards in Connecticut, Georgia, Idaho, Illinois, Louisana, Michigan, North Carolina, Oregon, Virginia and Washington.

CONTENTS.

Acidulous Radicals 31
Active Principles 104
Abbreviations.......... 5
Abstracts.......... 76
Antipyrine, its Incompatibilities 102
Balsams.......... 79
Botany 131
Botanical Origin.......... 140
Cerates.......... 79
Chemistry 19
Chemical Notation.......... 25
Chemical Equations.......... 34
Chemical Formulæ.......... 38
Changes of Officinal Names 122
Decoctions 80
Definitions.......... 75
Doses 107
Drugs of Aninal Origin.......... 149
Elementary Substances 29
Elixirs.......... 80
Extracts 82
Extracts, Fluid 81
Explosive Compounds 118
Glycerites 83
Gums 83
Gum Resins.......... 83
Habitats 120
Honeys 88
Incompatibilty 98
Incompatibles.......... 100
Ingredients of.......... 123
Insoluble Salts 99
Infusions.......... 83
Liniments 84
Liquors..........85-86

Metric System 8
Mixtures 88–126
Mucilages 89
Mode of Preparation 111
Miscellaneous Questions and Answers.. 40
Miscellaneous Questions without Answers.. 70
New Remedies.. 11
Ointments.. 96
Officinal Names 112
Oleates.. 89
Oleoresins 90
Per Cents.. 105
Pharmacy Laws 153
Pills 90
Poisons and Antidotes.. 109
Resins.. 91
Specific Gravity.. 106
Specific Gravities.. 106
Specimens 151
Spirits 91
Suppositories.. 93
Solvents.. 103
Soluble Salts.. 100
Solubilities 150
Syrups.. 93
Synonymous.. 126
Tinctures 94
Troches 96
Waters.. 78
Vinegars 77
Volatiles.. 99
Weights and Measures 7
Wines.. 97



℞ Ferri Phos Gr xx
Quini S .. xii
Strych S .. ss
Ac Phos dil q.s.
M ft pil no xv
Sig one 3 times day

JUST OUT

GRAY'S PRESCRIPTIONIST.

The only work on the market devoted entirely to prescriptions. A treatise on the reading and compounding of physician's prescriptions, with fac-similes of obscure prescriptions, illustrating the difficulties experienced in reading and compounding them. Also Tables of Abbreviations, Latin Directions, Weights and Measures, Poisons and Antidotes, Metric Prescriptions. The Subjects of Incompatibility, and all classes of difficult prescriptions are treated fully, with much other valuable information relating to the prescription case. No prescription clerk should be without it. Neatly bound in cloth, sent post-paid to any address upon receipt of $1.50, by

GRAY & BRYAN,
PUBLISHERS.
P. O. Box 593, - - CHICAGO, ILL.

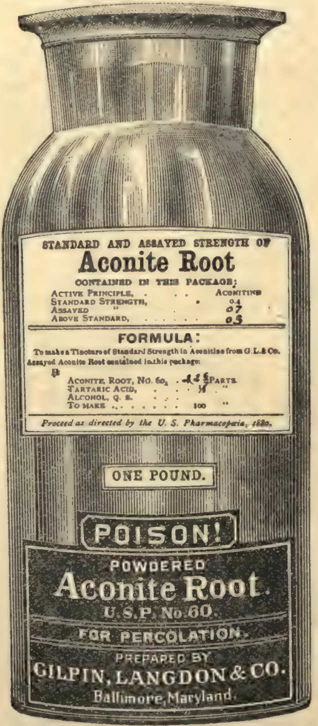
GILPIN, LANGDON & CO.,

BALTIMORE, MARYLAND.

We are Originators of Assayed Powdered Drugs

FOR PERCOLATION.

In this generation of rapid advancement in every profession, that of pharmacy has kept fully abreast with the times. Appreciating this fact and also that this constant tendency toward a higher standard would bring with it a demand for better and more perfect Powdered Drugs and Powders for Percolation, we established some time since a complete plant for their production.


STANDARD AND ASSAYED STRENGTH OF
Aconite Root
CONTAINED IN THIS PACKAGE:
ACTIVE PRINCIPLE, . . . ACONITINE
STANDARD STRENGTH, . 0.4
ASSAYED " . 07
ABOVE STANDARD, ... 03
FORMULA:
To make a Tincture of Standard Strength in Aconitine from G. L. & Co. Assayed Aconite Root contained in this package:
℞
ACONITE ROOT, NO. 60, . PARTS
TARTARIC ACID, . . "
ALCOHOL, Q. S. . . .
TO MAKE . . . . 100 "
Proceed as directed by the U. S. Pharmacopœia, 1880.
ONE POUND.
POISON!
POWDERED
Aconite Root.
U.S.P. No 60.
FOR PERCOLATION.
PREPARED BY
GILPIN, LANGDON & CO.
Baltimore, Maryland.

With these facilities and our very exhaustive system for research and experiment, we have been for several years enabled to supply a class of powdered drugs heretofore unobtainable, and judging from the numerous complimentary letters received from the leading pharmacists of the country our efforts have not been in vain.

We are confident that every pharmacist will consult his best interests in adopting our Powders for Percolation, and being anxious to have them generally used, we offer to send them on approval, and if not better quality, and if they do not make finer and handsomer preparations than ever before obtained they may be returned at our expense.

It will therefore cost you nothing to see and to try what we are assured by several thousand pharmacists are the best articles of the kind that they have ever seen or used.

We make the offer, knowing from our past experience that you will on trial adopt them in your laboratory.

—GET—

GRAY'S URINALYSIS

- - - FOR - - -

COMPLETE AND IMPROVED DIRECTIONS

FOR TESTING URINE.

Remembering that the Pharmacist is very often called upon by the Physician to test suspected samples of urine, we have tried in this pamphlet to give the best and simplest processes for procedure.

PRICE BY MAIL, POSTAGE PREPAID, 25c.

- - - ORDER OF - - -

GRAY & BRYAN, Publishers,

Box 593, CHICAGO ILL.

SHARP & DOHME
(Established 1860.)
BALTIMORE, MD.
NEW YORK. CHICAGO.
Manufacturers of all the Officinal and other Standard

Fluid, Solid and Powdered Extracts

INCLUDING ALL NEW REMEDIES.

——PURE——

Chemicals, Elixirs, Syrups, Essence of Pepsin

Pure and Saccharated Pepsins
Granular Effervescent Salts
Compressed Tablets
Compressed Lozenges
Tablet Triturates, Etc., Etc.
Ergetole
Pan-Peptic Tablets
Lapactic Pills, S. & D.'s
Soluble Gelatin Coated
And Sugar Coated Pills

Comprising all the Officinal and other well-known formulæ.

Unexcelled in Point of Reliability, Beauty and Finish.

We call special attention to our

SOLUBLE HYPODERMIC TABLETS.

These Tablets are quickly and perfectly soluble in cold or warm water. They combine accuracy of dose with perfect preservation of the active ingredient. The base with which the latter is combined is perfectly harmless and unobjectionable. They will cause no abscesses. They will not become insoluble by age. They may be administered by the mouth.

Catalogues, giving Composition, Doses, etc., of all our Preparations mailed free on application.

Our Preparations can be obtained of all the leading drug houses in all the principal cities.

Robinson's Latin Grammar

—OF—

Pharmacy and Medicine.

By H. D. ROBINSON, Ph. D.,

Professor of Latin Language and Literature, University of Kansas, Lawrence. With an Introduction by L. E. SAYRE, PH. G., Professor of Pharmacy in, and Dean of the Department of Pharmacy, University of Kansas.

WITH ELABORATE VOCABULARIES.

12mo. Handsome Cloth Binding. Price, $2.00

Sent by mail, postpaid, upon receipt of price, or may be ordered from any Wholesale Druggist or Bookseller.

By the aid of this book the student of Pharmacy is at once, introduced to the Latin that he is brought in contact with; with the words, and their meanings, that he must use, and the proper prefixes and affixes that are so numerous in Botany and materia medica. At the end of the work extensive vocabularies--Latin-English and English-Latin—have been added. These are a most important and one of the most useful features of the work.

"It is a work that meets with my hearty approval. There is great need of just such a book in our American schools of Pharmacy and Medicine."—*E. S. Bastin, Professor of Botany Dept. of Pharmacy, Northwestern University, Chicago.*

"It is practical; its arrangement shows the careful and thoughtful genius of its author, who seems to have comprehended just the needs of the student, and put it in such genial form as to lead the pupil rapidly to an understanding of what he had feared would be uninteresting and tedious."—*Pharmaceutical Record.*

P. BLAKISTON, SON & CO.,

MEDICAL AND PHARMACEUTICAL
BOOKSELLERS,
1012 WALNUT STREET, PHILADELPHIA.

☞Catalogue free.

CISTENE

ANTISEPTIC PROPHYLACTIC

The safest and most agreeable antiseptic for internal administration. For all Fevers, Diphtheria, Cholera and Pulmonary Consumption, to control fermentation and disinfect the stomach.

DOSE.—One teaspoonful three or four times daily, diluted with water or in combination with other drugs.

Externally in Obstetrics, Gynecology, Erysipelas, all Mucous Membrane Catarrhs, Gonorrhœa, Leucorrhœa, etc.

Used with great success as a local application to wounds, ulcers and abscesses.

As a mouth wash CISTENE arrests fermentation, purifies the breath and prevents decay.

This preparation is unexcelled for washing and dressing surgical wounds.

Below are Given a Few of the Uses to which CISTENE is ESPECIALLY Adapted.

Apply freely on absorbent cotton and keep bandages saturated with CISTENE, for the prevention of pus and the rapid healing of all kinds of wounds.

As a gargle for sore throat use equal parts of CISTENE and water.

In nasal Catarrh CISTENE will be found very beneficial in the form of spray from an atomizer, or simply snuffed up the nostrils.

For cleansing the teeth and purifying the breath CISTENE has no equal. Used upon the tooth brush and as a general mouth wash it arrests fermentation, prevents decay and rapidly heals all sores. It will be found especially useful after the extraction of teeth, to reduce inflammation.

Gonorrhœa and Leucorrhœa are quickly cured by injecting CISTENE diluted with an equal amount of water, two or three times a day.

Gray Chemical Co.,

P. O. BOX, 593. **CHICAGO, ILL.**

20

40

0
3
8
0
1
80
168
16
1

207.

Senna pulv.	5 ʒ
Glycyrrhiza	4 "
Oil coriander	℥
Sulphur	1½ ℥
Sugar Pow:	9½ ʒ

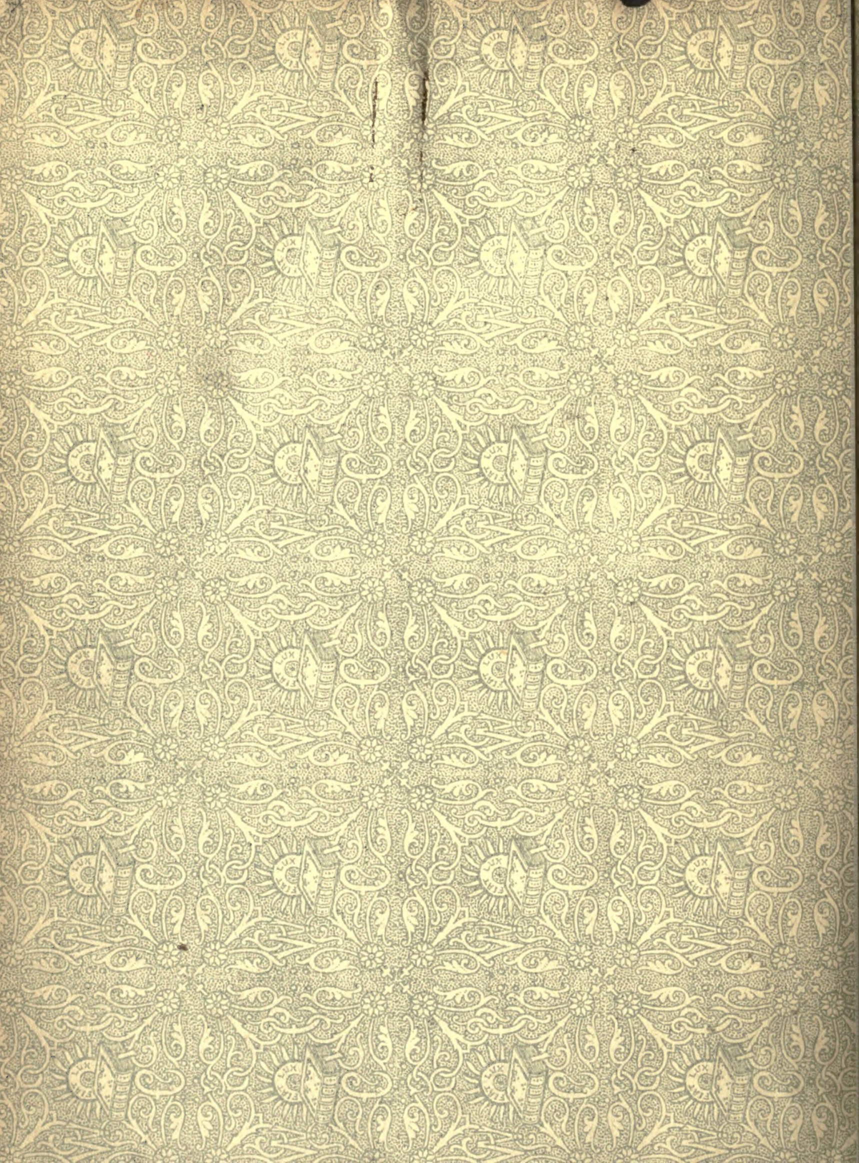
25%

20%

5%

10%

40%


FIAT LUX

PLEASE DO NOT REMOVE
CARDS OR SLIPS FROM THIS POCKET

UNIVERSITY OF TORONTO LIBRARY

S&M
A
106